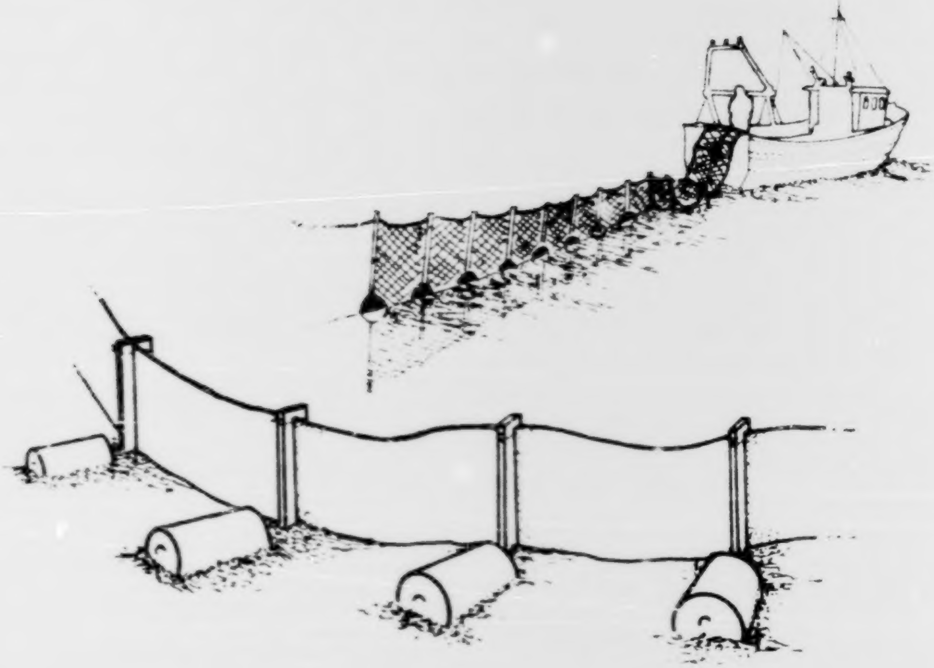
A Catalogue of Oil Spill Containment Barriers

Report EPS 9 SP 1
September 1986



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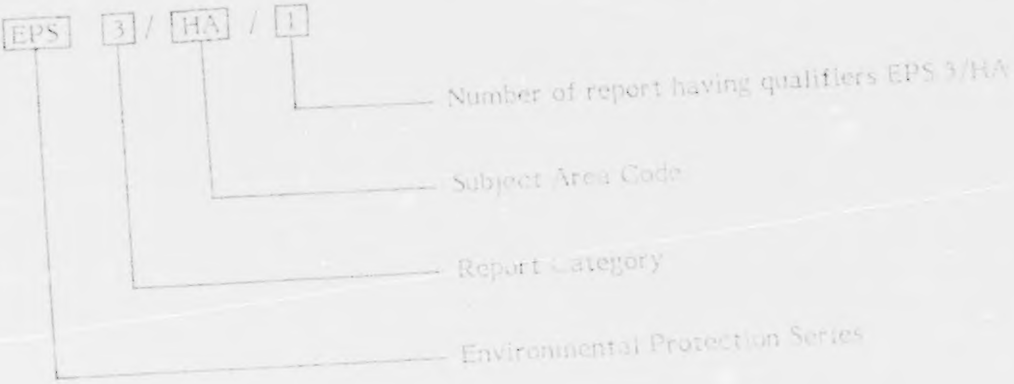
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A CATALOGUE OF OIL SPILL CONTAINMENT BARRIERS

prepared by

L.B. Solsberg
S.L. Ross Environmental Research Ltd.

for the

Technology Development and Technical Services Branch
Conservation and Protection
Environment Canada

EPS 9/SP/1
September 1986

REVIEW NOTICE

This report has been reviewed by the Technology Development and Technical Services Branch, and approved for publication. Approval does not necessarily signify that the contents reflect the views and policies of Environment Canada. Mention of trade names or commercial products does not constitute recommendation or endorsement for use.

READERS' COMMENTS

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ABSTRACT

This report provides information concerning various types of mechanical oil spill containment barriers conceived for the purpose of spill control. The barriers are listed in alphabetical order according to the manufacturer, distributor and/or developer to facilitate use of the document as a guide.

RÉSUMÉ

Des renseignements sont présentés au sujet de divers types de barrière mécanique anti-pétrole. Pour faciliter l'utilisation du document comme guide, les barrières sont classées par ordre alphabétique des fabricants, des vendeurs et des concepteurs.

FOREWORD

The information contained in this report was compiled by Mr. L.B. Solsberg of S.L. Ross Environmental Research Limited under contract to Environment Canada. Any opinions expressed reflect those of the author as well as test data and performance criteria found in the literature. Subjective views given under Operational Data for specific barrier models that have not been field evaluated are stated with conditionality. The words "could", "should", "likely" and "probability" are used to indicate expected boom performance in such cases.

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ACKNOWLEDGEMENTS

The manufacturers and distributors of oil spill containment barriers are acknowledged for their provision of technical data on which the physical specifications for each boom are based. The operational data were compiled from file literature, reports and technical papers made available by Environment Canada as well as from the field experience of S.L. Ross Environmental Research Limited employees. Discussion also took place with personnel at the US Environmental Protection Agency's Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT) located in Leonardo, New Jersey. In particular, Mr. M.F. Fingas and Mr. K.M. Meikle of Environment Canada and Mr. H.W. Lichte of Mason & Hanger-Silar Mason Co., Inc. at OHMSETT are thanked for their assistance. Formatting and data presentation were the work of Mrs. L.P. Forestell of S.L. Ross Environmental Research Limited while Mrs. K. Curran provided the art work.

1 INTRODUCTION

1.1 Report Contents

The specifications and operational characteristics of oil spill containment barriers that are currently available or known to be in use are summarized in this catalogue. Mechanical devices that either are or have been sold commercially, or in several instances, that have been developed to the prototype stage, are examined.

The catalogue is comprised of two sections: MAIN ENTRIES, in which two pages are used to describe each boom, and ABBREVIATED ENTRIES consisting of one or more paragraphs of information. Both the main entries and the abbreviated entries have been individually organized in alphabetical order according to company. Names of all manufacturers and distributors appearing in both sections are given in the INDEX. The index also includes designations for all models referenced in the catalogue.

Sources of information used to compile the catalogue, such as evaluation reports for specific booms and other technical literature on performance criteria and related boom characteristics, are listed in the REFERENCES section. References for individual barriers independently tested are also cited where appropriate for main entries under the heading ADDITIONAL INFORMATION. The reader is directed to these impartial sources if further data are required.

Data which should assist the reader in understanding the numerical information presented are summarized in the NOMENCLATURE AND CONVERSION FACTORS section.

1.2 Abbreviated Entries

The section of abbreviated entries includes devices no longer being produced, distributors acting on behalf of manufacturers, nonmechanical or unconventional barriers such as sorbent or pneumatic booms, and/or companies which did not respond to written inquiries. In several cases, time limitations associated with the project precluded an expansion upon the data received so that only the brief, narrative form was prepared. Specific reasons for inclusion of the boom in the abbreviated entries section are often given; use of the past tense indicates a commercial product known to have been fabricated but not confirmed to be available now. Data in the abbreviated entries section are usually restricted to sizes, weights and materials with performance indicated where possible.

1.3 Main Entries

Devices included as main entries have been developed beyond the prototype stage and have been or are being marketed commercially. Sales brochures were consulted for all such booms and physical specifications are, for the most part, generally obtainable.

The main entries section presents one page of PHYSICAL SPECIFICATIONS and a second page detailing OPERATIONAL DATA. The specifications are self-explanatory and were obtained from sales literature and from a detailed questionnaire that was sent to each company. The operational information, on the other hand, contains subjective comments on anticipated performance and usage based on technical reports and papers as well as information provided by users and evaluators of the equipment. More specifically, the basic components of each boom, various construction and design details, and the application of the boom to oil spill containment operations are considered.

The following section briefly explains the statements made in each of the subsections on operational data. This should be of assistance in relating boom performance to system components, different product types, and other technical considerations such as success and failure modes. This type of approach is encouraged when selecting a boom for a specific purpose.

2 OPERATIONAL DATA

2.1 Application

Overall height usually determines where a boom can be applied. Generally, booms 0 to 50 cm can be applied in inland waters or nearshore, 50- to 100-cm barriers can be effectively used in more exposed locations, and containment devices one metre or more in height can be considered for use offshore. Other factors should also be examined. For example, an offshore product should have robust construction and high reserve buoyancy or, more generally, potential for overall stability and durability. Solid flotation booms are favoured over air buoyancy units for long-term use, while a reliance on mechanical components is viewed as restricting the boom to short-term operations. The sea states given were taken from the chart which is shown in Table 1. Sea state 3 was chosen as the limit at which mechanical barriers could be seen to effectively contain oil, because "rough" conditions develop at sea state 4.

2.2 Oil Containment

The primary factors considered in determining the potential of a boom to contain oil relate to stability, wave conformance, and resistance to various oil loss mechanisms. Booms with cylindrical flotation incorporating top and bottom tension members have been found to exhibit excellent stability and can be applied, in many cases, to both the stationary containment and angled deflection or "sweeping" of oil. Short or segmented floats as well as cylindrical air chambers generally offer highest wave conformance capability. In a number of instances, fence booms have sufficient flotation coupled with adequate freeboard to be utilized in exposed waters. Several such devices, in fact, make use of external tension or bridle systems which permit stable sweeping operations. For the most part, splashover (oil overtops the boom) and drainage (direct loss of oil under the boom) should not occur if the use of a boom is confined to conditions appropriate to its intended application as indicated in this catalogue. This is generally a valid assumption since freeboard and draught, the sections of boom above and below the waterline, respectively, have adequate dimensions to prevent such losses.

Entrainment is the buildup of a head wave of oil against a boom in a current and the resultant loss of oil droplets from the head wave under the boom. Devices with top and bottom tension members and cylindrical flotation were judged to be best performers in currents to halt oil losses through entrainment; about 1.5 knots (0.8 m/s) was viewed as the maximum water velocity in which a boom could be angled for oil

TABLE 1 *SEA STATES FOR FULLY ARISEN SEA*

SEA STATE	SEA DESCRIPTION	WIND DESCRIPTION	WIND VELOCITY, KNOTS	(km/h)	AVERAGE HEIGHT, ft.	(m)	SIGNIFICANT HEIGHT, ft.	(m)	APPROX. PERIOD-RANGE, (s)
0	ripples	light airs	2	(3.7)	0.05	(0.02)	0.08	(0.02)	up to 1.2
1	small wavelets, still short	light breeze	5	(9.3)	0.18	(0.05)	0.29	(0.09)	0.4 to 2.8
	large wavelets, crests begin to break	gentle breeze	8.5	(15.8)	0.6	(0.18)	1.0	(0.30)	0.8 to 5.0
2			10	(18.5)	0.88	(0.27)	1.4	(0.43)	1.0 to 6.0
	small waves, becoming larger	moderate breeze	12	(22.2)	1.4	(0.43)	2.2	(0.67)	1.0 to 7.0
			13.5	(25)	1.8	(0.55)	2.9	(0.88)	1.4 to 7.6
3			14	(25.9)	2.0	(0.61)	3.3	(1.01)	1.4 to 7.8
			16	(29.7)	2.9	(0.88)	4.6	(1.40)	2.0 to 8.8
4	moderate waves, taking a more pronounced long form	fresh breeze	18	(33.4)	3.8	(1.16)	6.1	(1.86)	2.5 to 10.0
			19	(35.2)	4.3	(1.31)	6.9	(2.10)	2.8 to 10.6
			20	(37.1)	5.0	(1.52)	8.0	(2.44)	3.0 to 11.1
5	large waves begin to form	strong breeze	22	(40.8)	6.4	(1.95)	10	(3.05)	3.4 to 12.2
			24	(44.5)	7.9	(2.41)	12	(3.66)	3.7 to 13.5
			24.5	(45.4)	8.2	(2.5)	13	(3.96)	3.8 to 13.6
6			26	(48.2)	9.6	(2.93)	15	(4.57)	4.0 to 14.5
	sea heaps up and white foam from breaking waves begins to form	moderate gale	28	(51.9)	11	(3.34)	18	(5.49)	4.5 to 15.5
			30	(55.6)	14	(4.27)	22	(6.71)	4.7 to 16.7
			30.5	(56.5)	14	(4.27)	23	(7.0)	4.8 to 17.0
			32	(59.3)	16	(4.88)	26	(7.92)	5.0 to 17.5
	moderately high waves of greater length	fresh gale	34	(63)	19	(5.79)	30	(9.14)	5.5 to 18.5
7			36	(66.7)	21	(6.4)	35	(10.67)	5.8 to 19.7
			37	(68.6)	23	(7.0)	37	(11.28)	6 to 20.5
			38	(70.4)	25	(7.62)	40	(12.19)	6.2 to 20.8
8			40	(74.1)	28	(8.53)	45	(13.72)	6.5 to 21.7
	high waves; sea begins to roll; visibility affected	strong gale	42	(77.8)	31	(9.45)	50	(15.24)	7 to 23
			44	(81.5)	36	(10.97)	58	(17.68)	7 to 24.2
			46	(85.2)	40	(12.19)	64	(19.51)	7 to 25
	very high waves with long over hanging crests	whole gale	48	(89)	44	(13.41)	71	(21.64)	7.5 to 26
			50	(92.7)	49	(14.94)	78	(23.77)	7.5 to 27
9			51.5	(95.4)	52	(15.85)	83	(25.30)	8 to 28.2
			52	(96.4)	54	(16.46)	87	(26.52)	8 to 28.5
			54	(100.1)	59	(17.98)	95	(28.96)	8 to 29.5
	exceptionally high waves; visibility affected	storm	56	(103.8)	64	(19.51)	103	(31.39)	8.5 to 31
			59.5	(110.3)	73	(22.25)	116	(35.36)	10 to 32
	air filled with foam and spray	hurricane	>64	>(118.6)	>80	>(24.38)	>128.01	>(39.01)	10 to 35

deflection without incurring significant losses. Fence-type designs with no tension members are believed to have the least potential in this regard although a simple rigid boom fabricated from high-weight material with good buoyancy should be capable of containing oil in low currents. Overall, the ability of a barrier to assume a full, upright position or remain stable is vital to its oil containment potential whether used in stationary modes or deployed at relative current velocities up to about 0.75 knot (0.4 m/s).

2.3 Strength and Durability

The main item examined for strength and durability was fabric type. A range of similar products is fabricated world-wide so that combinations of two components -- PVC, nylon, polyurethane, neoprene and/or polyamide--are usually used. Most materials offer good resistance to various forms of damage such as weathering, puncture, tearing and abrasion. Tensile and tear strengths were reviewed for each product.

Thermally-welded or vulcanized fabric seams are not prone to damage when stressed at higher sea states although some manufacturers incorporate reinforcing bands or webs, multiple rows of stitching and other methods to increase durability of non-welded materials. These construction details as well as the ultimate strength of tension members were all taken into account in determining overall strength and durability. Load distribution was also noted if it was thought to be a factor.

NOTE: More specific information than is contained either in this report or in many sales brochures should be acquired if a boom fabric is to be carefully considered. Several of the most important strength parameters include Tongue Tear, Grab Tensile, Strip Tensile and Adhesion. Both the sample size and test method (e.g., FTMS 191B Method 5100 or equivalent ASTM D 751-64T for grab tensile strength) should be quoted. These and other data should be available from each boom manufacturer. They can be compared to recommended minimum specifications proposed by ASTM Committee F-20. The exercise should be helpful in ensuring that the fabric will withstand the stresses imposed on it by the environment to which it is exposed. The data pertinent to fabric types given in this catalogue have not been standardized but should be of general use. The reader is cautioned against making direct comparisons amongst products particularly insofar as tensile strength is concerned.

2.4 Connection System

Connector types were examined for their ease of use, effectiveness and versatility. Favourable characteristics included lack of male/female distinction, locking devices and comprehensive attachment to the boom proper. Robustness and the potential to remain intact for long periods were looked for in permanent booms. The ability to make in-water connections was also examined or, alternatively, the necessity of preconnection on land or other assembly requirement. Compatibility with other connection systems can also be important particularly for large-scale operations.

2.5 Ease of Use

All booms were reviewed for specific storage needs, characteristics related to deployment and retrieval (e.g., smooth, snag-free sides), and their potential to be cleaned, maintained, repaired and reused. Factors considered included compactability or storage volume, weight, the use of ancillary hardware such as air compressors, mechanical lifting assistance and other specific retrieval methods, and the incorporation of handholds, detachable components and other aids.

2.6 Design Features

Comments are based on outstanding qualities of individual booms. These can include unique combinations of flotation units, ballast, tension members and/or materials as well as the physical form which components take. Where the manufacturer has incorporated construction detail improving the boom, this is described. Other examples include fittings such as handholds and anchor points and other components such as mooring systems and towing assemblies.

BIBLIOGRAPHY

Environment Canada, An Evaluation of Oil Pumps and Skimmers, Technology Development Report EPS 4-EC-81-4, Ottawa, Ontario (December, 1981).

Borst, M. and R.A. Griffiths, Quantified Performance Testing of the Zooom Boom, preliminary report EE-30, Environment Canada, Ottawa, Ontario, updated.

Buist, I.A., W.M. Pistruzak, S.G. Potter, N. Vanderkooy and I.R. McAllister, The Development and Testing of a Fireproof Boom, proceedings of the 1983 Oil Spill Conference, San Antonio, TX (February 28 - March 3, 1983).

Cohen, S. and S. Dalton, Self-contained Oil Recovery System for Use in Protected Waters, proceedings of the 1983 Oil Spill Conference, San Antonio, TX (February 28 - March 3, 1983).

Cormack, D. and B.O. Dowsett, Goodrich Boom. An Assessment of Design Concept and General Reliability, Warren Spring Laboratory, Stevenage, Hertfordshire (1977).

Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Oil Containment Booms, CG-D-78-78, US Coast Guard, Washington, D.C. (November, 1978).

Cunningham, J., A Rapidly Deployable Oil Containment Boom for Emergency Harbor Use, EPA-R2-73-112, US Environmental Protection Agency, Washington, D.C. (February, 1973).

Dahl, E. and E. Huse, Conventional Oil Booms and Skimmers for Offshore Oil Spill Clean-Up, The Ship Research Institute of Norway, Trondheim, Norway, (October, 1980).

Environment Canada, A Winter Evaluation of Oil Skimmers and Booms, Environmental Protection Service, Ottawa, Ontario, (September, 1981) (in preparation).

Greene, G. and D. Mackay, Development of Criteria for Evaluating Oil Containment Booms, Environment Canada, Ottawa, Ontario (1975) (unpublished).

Hubbell, P., F.A. March, L.S. Brown and G. Ruetenik, Development of New U.S. Navy Standard Oil Containment Boom, proceedings of the International Oil Pollution Prevention Conference and Exhibition, Hamburg, West Germany, (September, 1978).

Langfeldt, J.N. and M. Wold, Full Scale Tests with Oil Recovery Systems Offshore Norway, June 1980, Oil Pollution Control Research and Development Program, Oslo, Norway (June, 1981).

McCracken, W.E. and S.H. Schwartz, Performance Testing of Spill Control Devices on Floatable Hazardous Materials, EPA-600/2-77-222, US Environmental Protection Agency, Cincinnati, Ohio (November, 1977).

O'Brien, J.L., National Strike Force Response Ixtoc 1 Blowout - Bay of Campeche, proceedings of the 1981 Oil Spill Conference, Atlanta, GA (March, 1981).

U.S. EPA, Oil Spill Containment Systems, second edition, Edison, New Jersey (January, 1973).

Prairie Region Oil Spill Containment and Recovery Advisory Committee, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

Proposed ASTM Standard for Performance Characteristics for Spill Control Booms (July, 1978).

Robertson, L.A., Oil Spill Barriers and Their Use, Environment Canada, Ottawa, Ontario, EPS-3-EC-81-5, (December, 1981).

Seaward International, Inc., Oil Pollution Response Planning Guide for Extreme Weather, US Coast Guard, Washington, D.C. (November, 1979).

Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing, 1974-1979, EPA-600/9-81-007, US Environmental Protection Agency, Cincinnati, Ohio (January, 1981).

Smith, N.K. and H.W. Lichte, personal communication with Mason & Hanger-Silas Mason Co., Inc. at OHMSETT regarding boom trials November 1982, written data were preliminary and not for publication.

Solsberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

Vanderkooy, N., A. Robertson, and C.J. Beckett, Evaluation of Oil Spill Barriers and Deployment Techniques for the St. Clair-Detroit River System, Environment Canada, Ottawa, Ontario, EPS-4-EC-76-4 (March, 1976).

Warner, S., personal communication with Industrial Fabrics Association International, St. Paul, Minnesota, U.S.A.

Wilson, H.S. and C.R. Bailey, letters summarizing evaluation results for booms tested in the St. Clair River in May 1980, Petroleum Industry Marine Environmental Co-operative (Ontario).

NOMENCLATURE AND CONVERSION FACTORS

Nomenclature

a/b	Telex number answer back
ASTM	American Society for Testing and Materials
cm	centimetre
°C	degrees Celsius
daN	deca newtons
effective 21-12-82	date of price setting, day-month-year
F.Frs	French Francs
ft	feet or foot
FTMS	(U.S.) Federal Test Method Standard
g/m^2	grams per square metre
kg	kilogram
kg/m	kilograms per metre
m	metre
m/min	metres per minute
m/s	metres per second
m^2	square metres
m^3	cubic metres
Mk	Mark or model series
mm	millimetre
N	newtons
NA	not applicable
No.	number
OHMSETT	Oil and Hazardous Materials Simulated Environmental Test Tank (operated by the US Environmental Protection Agency in Leonardo, New Jersey, USA)
%	percent
PVC	polyvinylchloride
SEK	Swedish Kronor
tear strength	may refer to grab or strip tensile strength; one number refers to warp (fibres lying parallel to boom length); second number, if given, refers to weft or fill (fibres woven perpendicular to boom length); units expressed as weight or weight per unit length
telephone (613) 232-1564	(area code) local telephone number of Canadian and US companies

telephone (47)(02)143 590	(country code) (routing code) local telephone number of United Kingdom and European companies
tensile strength	usually refers to tongue tear; one number refers to warp (fibres lying parallel to boom length); second number; if given, refers to weft or fill (fibres woven perpendicular to boom length); units expressed as weight or weight per unit length

Conversion Factors

°C = (°F-32) x (5/9)

°F = (°C x 9/5) + 32

centimetres x 2.54 = inches
metres x 3.281 = feet
feet x 0.305 = metres

metres^3 x 35.3 = feet^3
feet^3 x 0.028 = metres^3

kilograms x 2.205 = pounds
pounds x 0.454 = kilograms
kilogram (force)/centimetre ≈ newtons/millimetre
ounces per yard^2 (fabric) x 3.39 = grams/metre^2

knots x 0.514 = metres/second

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This index is organized alphabetically according to manufacturer with product designations given for each company. Names of companies that are italicized appear in the catalogue as MAIN ENTRIES. Abbreviated entries are listed in this index in upper and lower case letters.

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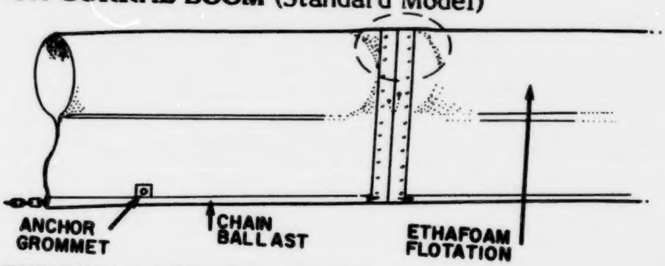
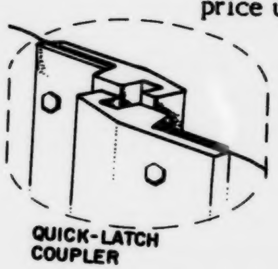
MAIN ENTRIES

ACME Products Co.
P.O. Box 51388
Tulsa, OK, 74151, USA
telephone (918)836-7184

OK CORRAL BOOM (Standard Model)

price upon request





PHYSICAL SPECIFICATIONS

	4 x 6 (in)	6 x 12 (in)	12 x 24 (in)
Dimensions	(10 x 15 cm)	(15 x 30 cm)	(30 x 60 cm)
overall height	25.4 cm	45.7 cm	91.5 cm
freeboard/flotation element	102 cm	15.2 cm	30.5 cm
draught	15.2 cm	30.5 cm	61.0 cm
section length	optional 1.8 to 91.4 m		
storage volume per 30.5 m	0.40 m^3	0.91 m^3	2.89 m^3
Weight			
per 30.5 m section	21.4 kg	27.2 kg	52.2 kg
per unit length	0.70 kg/m	0.89 kg/m	1.71 kg/m

Fabric (all models) - International Yellow, PVC-coated Jaton nylon

tensile strength	28.7 kg/cm
tear strength (estimated)	60 kg
cold crack temperature	-40°C
weight	746 g/m^2

Flotation - cylindrical 3.1 m (1.5 or 1.8 m optional) segments of flexible Ethafoam

buoyancy: weight ratio	3.4:1	6:1	12.6:1

Connector - aluminum Acme Quick-Latch or nylon webbing Flexible Coupling

Ballast/Lower Tension Member -	galvanized chain in all models		
size	6.35 mm	6.35 mm	9.5 mm
ultimate tensile strength	2132 kg	2132 kg	4444 kg

Top Tension Member - none in all models

Anchor Points - grommets spaced every 3 m (toward bottom edge) every 15.2 m (toward top edge)

Other Data - no vertical stiffeners, handholds; optional flotation diameters 2.5 to 76 cm; Mini-Boom also available with 5.1-cm flotation, 10.2-cm skirt and 6.35-mm chain ballast

OPERATIONAL DATA

Application

- 4 x 6 in (10 x 15 cm) calm inland waters, sea state 1; 6 x 12 in (15 x 30 cm) harbours, up to sea state 2; 12 x 24 in (30 x 60 cm), more exposed areas, up to sea state 2-3
- consider primarily for stationary containment for work periods up to several weeks; angled in deflection in low currents should also be possible

Oil Containment

- cylindrical flotation element should enable boom to resist submerging and should result in excellent wave conformity and stability
- ballast chain should prevent planing and skirt deflection
- freeboard and draught are adequate for inshore waters, although use of 4 x 6 in (10 x 15 cm) boom should be restricted to calm conditions only

Strength and Durability

- coated fabric has good resistance to weathering, puncture, abrasion and tearing
- all fabric junctures are thermally sealed and not prone to snagging or disjunction; chain pocket is double layer of fabric
- boom ends reinforced with nylon webbing
- Ethafoam flotation has good flexibility and should withstand bending; generally, the boom should survive debris infestations

Connection System

- Quick-Latch connectors interlock easily; disengagement in high sea states 3-4 may be possible
- locking pin secures connection; no tools required
- connectors are preshackled to tension members
- flexible coupler should be used for long-term deployment
- adaptors can be procured for connection to other booms

Ease of Use

- shorter flotation log can be purchased for easier storage; the booms are not highly compactible because of the cylindrical elements
- 4 x 6 in (10 x 15 cm) and 6 x 12 in (15 x 30 cm) are relatively lightweight and, coupled with their smooth sides, should be easy to deploy; 12 x 24 in (30 x 60 cm) is heavier and less manoeuverable
- optional handholds preferable to facilitate retrieval of 12 x 24 in (30 x 60 cm)

Design Features

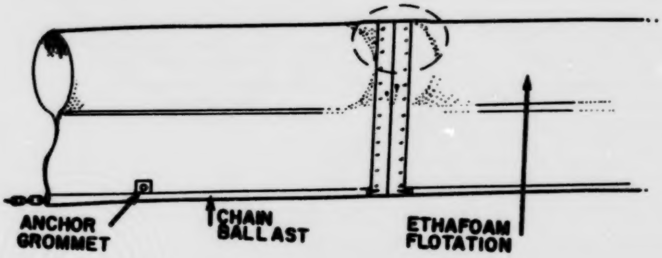
- all models have adequate reserve buoyancy (12 x 24 in (30 x 60 cm) excellent)
- all metal components are corrosion-resistant
- high fabric weight, thermal seals and enclosed flotation should allow easy cleaning and several reuses

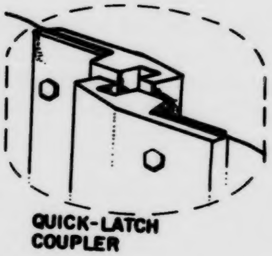
ADDITIONAL INFORMATION

McCracken, W.E., Performance Testing of Selected Inland Oil Spill Equipment, EPA-600/2-77-150, US Environmental Protection Agency, Cincinnati, OH (August, 1977).

OK CORRAL BOOM (Heavy Duty Model)
(Acme Products Co.)

price upon request





PHYSICAL SPECIFICATIONS

	6 x 12 (in)	12 x 24 (in)
Dimensions	(15 x 30 cm)	(30 x 60 cm)
overall height	48.3 cm	94 cm
freeboard/flotation element	17.8 cm	33 cm
draught	30.5 cm	61 cm
section length	optional 1.8 to 91.4 m	
storage volume per 30.5 m	0.96 m^3	3.0 m^3
Weight		
per 30.5 m section	98 kg	179 kg
per unit length	3.2 kg/m	5.9 kg/m
Fabric (both models) - International Yellow, PVC-coated Jaton nylon		
tensile strength	28.7 kg/cm	
tear strength (estimated)	60 kg	
cold crack temperature	-40°C	
weight	746 g/m2	
Flotation - cylindrical 3.1 m (1.5 or 1.8 m optional) segments of flexible Ethafoam		
buoyancy: weight ratio	5.5:1	12:1
Ballast/Lower Tension Member - galvanized chain in both models		
size	6.35 mm	9.5 mm
ultimate tensile strength	2132 kg	4444 kg

Top Tension Member - 7.9 mm galvanized cable (both models) ultimate tensile strength = 4444 kg

Anchor Points - grommets spaced every 3 m (toward bottom edge) every 15.2 m (toward top edge)

Other Data - no vertical stiffeners, handholds; optional flotation diameters to 76 cm

OPERATIONAL DATA

Application

- 6 x 12 in (15 x 30 cm) harbours and inshore use, up to sea state 2; 12 x 24 in (30 x 60 cm) suitable for more exposed waters, up to sea state 2-3
- can be angled for oil deflection in currents up to 1.5 knots (2.8 km/h) or used for containment in stationary mode

Oil Containment

- tension members top and bottom plus cylindrical flotation render booms highly stable; excellent resistance to submerging, planing and skirt deflection
- cylindrical flotation should result in very good wave conformity
- freeboard and draught are adequate to prevent splashover and drainage under indicated condition of use

Strength and Durability

- coated Jaton fabric resists weathering, puncture, abrasion and tearing
- thermally-sealed junctures should not disengage if boom is maltreated
- nylon webbing reinforces ends to ad to boom's strength
- two tension members should provide high strength if load is distributed evenly at connector
- Ethafoam flotation is flexible and durable

Connection System

- Quick-Latch couplers interlock easily; disengagement in high sea states 3-4 may be possible
- locking pin secures connection; no tools are required
- flexible coupler should be considered for long-term use
- connectors are preshackled to both tension members

Ease of Use

- booms are not highly compactible; optional shorter flotation segment may render storage easier
- 6 x 12 in (15 x 30 cm) is of moderate weight and the 12 x 24 in (30 x 60 cm) relatively heavy for its size; smooth sides should permit snag-free use
- booms are easily cleaned; avoid prolonged exposure to solvents

Design Features

- both models have good reserve buoyancy
- all metal components are corrosion-resistant
- high fabric weight, thermal seals, enclosed flotation and upper tension cable should allow several reuses

ADDITIONAL INFORMATION

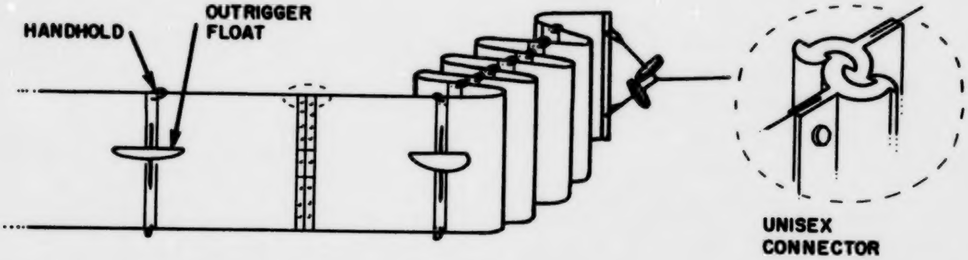
McCracken, W.E., Performance Testing of Selected Inland Oil Spill Equipment, EPA-600/2-77-150, US Environmental Protection Agency, Cincinnati, OH (August, 1977).

Albany International
Technical Fabrics Division
P.O. Box 1062
Buffalo, NY, 14240, USA
telephone (716)824-8484
telex 91-6474

price (point of manufacture $US/ft, 1 January, 1983)

Oilfence 16	$27.25
Oilfence 24	$36.65
Oilfence 36	$69.55

OILFENCE (16, 24 and 36)



PHYSICAL SPECIFICATIONS

	16	24	36
Dimensions			
overall height	41 cm	61 cm	84 cm
freeboard	20.5 cm	30.5 cm	42 cm
draught	20.5 cm	30.5 cm	42 cm
section length	30.5 m	30.5 m	30.5 m
shipping volume	1.92 m^3	2.29 m^3	5.66 m^3
Weight			
per section	132 kg	175 kg	310 kg
per unit length	4.32 kg/m	5.73 kg/m	10.16 kg/m

Fabric (all models) - International Orange, polyurethane-impregnated woven polyester

tensile strength	321.3 kg/cm
tear strength	100 kg
cold crack temperature	-55°C
weight	1230 g/m^2

Flotation - incorporated as outrigger/stabilizer molded polyethylene, urethane foam-filled

buoyancy: weight ratio	3.5:1	3.2:1	4:1
spacing	96.5 cm	122 cm	146 cm
special features	rotates for storage		

Connector - high-density PVC unisex (see figure)

Ballast/Tension Members - none

Vertical Stiffeners (spacing) -	1 (m)	1.23 (m)	1.44 (m)
Handholds (spacing) -	1 (m)	1.23 (m)	1.44 (m)

Anchor Points (spacing) - 30.5 m in all models

OPERATIONAL DATA

Application

* permanent installations and emergency deployment in harbours, sea state 1-2 (model 16), nearshore, up to sea state 2 (model 24) and offshore up to sea state 2-3 (model 36 only)
* suitable for long-term stationary containment because of durability

Oil Containment

* outrigger floats enable boom to resist planing, submerging and skirt deflection
* wave conformance may deteriorate in steep, breaking seas due to bridging between crests
* dimensions are adequate to resist drainage and splashover in wave periods greater than 2 seconds

Strength and Durability

* fabric is highly durable and not susceptible to tearing, puncture or abrasion
* load is distributed over entire boom height; no tension members are needed; fabric has very high tensile strength
* fabric is ozone, UV and low temperature tolerant; testing has shown outriggers and axles to have high strength

Connection System

* plastic-on-plastic fittings provide low friction, end-to-end connection
* locking pin mechanism remains in closed position once secured
* bolted attachment to boom should result in even load distribution and in low probability of disengagement
* may be compatible with other booms

Ease of Use

* boom stores compactly for transportation and storage
* connection on land is preferable; deployment is readily accomplished
* for retrieval, crane lift of line run through mooring rings is possible; snagging of outriggers on pier face may occur otherwise
* smooth, non-porous surface cleans easily by solvents, pressure washers

Design Features

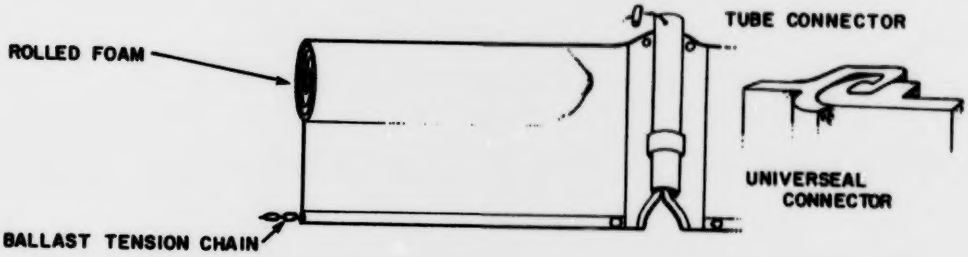
* symmetrical design allows deployment with either side up
* plastic and stainless steel fittings are corrosion-resistant
* flotation has good reserve buoyancy and is impervious to oil
* models 16, 24 and 36 are highly stable; an earlier model 48 was less satisfactory and is no longer being produced

ADDITIONAL INFORMATION

1. A Winter Evaluation of Oil Skimmers and Booms, Environmental Protection Service, Environmental Canada, Ottawa, Ontario (in preparation).
2. Oil Spill Containment Boom Evaluation Trials-North Saskatchewan River, Canadian Petroleum Association, Calgary, Alberta (August, 1980).

American Boom & Barrier Corp.
P.O. Box 933
Port Canaveral, FL, 32920, USA
telephone (305)784-2110

MINIBOOMS (Skimming, Sweeper, Banter, Contain-it Models) price upon request



PHYSICAL SPECIFICATIONS

Dimensions	
overall height	5.1 to 25.4 cm
freeboard	2.5 to 10.2 cm
draught	2.5 to 15.2 cm
section length	3 to 15 cm
shipping volume	unspecified

Weight unspecified

Fabric (chemical-resistant XR-5B fabric optional) - yellow, PVC-coated nylon or polyester

tensile strength	225 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2

Flotation - cylindrical 2.5 to 10.2 cm diameter, rolled foam
buoyancy: weight ratio unspecified

Connector - brass grommets in Skimming and Sweeper Booms; Universeal or slotted tube in Banter and Contain-it

Ballast/Lower Tension Member - none in Skimming Boom; 4.76 mm chain (ultimate tensile strength = 1364 kg) in Sweeper and Banter Booms; 6.35 mm chain (ultimate tensile strength = 2720 kg) in Contain-it model

Top Tension Member - 6.35 mm cable in Contain-it Plus model only

Other Data - no vertical stiffeners; anchor points and handholds unspecified

OPERATIONAL DATA

Application

- Skimming boom designed for sumps and other confined areas; Sweeper, Banter and Contain-it booms intended for prolonged use in sheltered shallow waters
- all booms applicable to calm water only; except for Skimming Boom, all should survive a sea state of 3
- consider primarily for stationary containment; Banter, Sweeper, and Contain-it booms are also applicable to oil diversion in small creeks

Oil Containment

- cylindrical flotation element should enable booms to resist submerging and generally contribute to good stability
- low freeboard generally precludes use in waves; Contain-it boom is exception in this regard and should conform well to waves 10 to 20 cm in height
- ballast chain should prevent planing and skirt deflection when booms are used in streams

Strength and Durability

- coated fabric has excellent resistance to weathering, puncture, tearing and abrasion
- fabric junctures are heat-sealed and not prone to snagging or disjunction
- lower ballast chain adds considerably to strength of small booms
- small, lightweight models coupled with high fabric weight of 746 g/m^2 should result in very durable booms
- rolled foam flotation has good strength qualities; booms should withstand debris infestations

Connection System

- Universeal connector is easily used; optional PVC slotted tube is also appropriate for boom size
- preshackling of ballast chain precludes use of tools
- small boom size allows quick connections to be made on land or in water

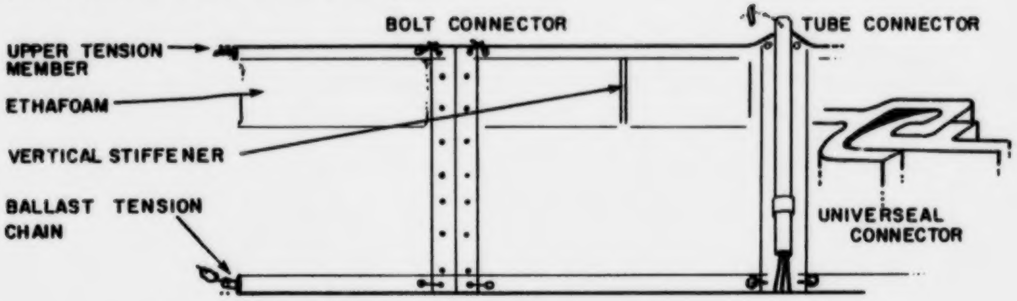
Ease of Use

- relatively compactible; however, cylindrical flotation in Banter and Contain-it models is large enough to warrant special storage consideration
- all booms are assumed to be very lightweight
- deployment and retrieval of these smooth-sided booms should be quick and accomplished without snagging
- booms have high potential for reuse, have good repairability in field, and should be easily cleaned

Design Features

- flotation is fully enclosed and of appropriate configuration for the intended use of the boom
- thermally-sealed fabric seams, high fabric weight, and tension chain render these small, lightweight booms applicable for repeated use
- chemical-resistant fabric optional

FLAT/FENCE BOOM (CG, CG-1, 3 & 4 Models) price upon request
(American Boom & Barrier Corp.)



PHYSICAL SPECIFICATIONS

Dimensions	CG	CG-1	CG-3	CG-4
overall height	35.6 cm	45.6 cm	43.1 cm	45.6 cm
freeboard/flotation	10.2 cm	15.2 cm	15.2 cm	15.2 cm
draught	25.4 cm	30.4 cm	27.9 cm	30.4 cm
section length	15.2 m	30.5 m	30.5 m	15.2 m
shipping volume (CG-1 only)		0.6 m^3		

Weight (CG-1 only)

per section	104 kg
per unit length (kg/m)	3.4 kg/m

Fabric (all models--chemical-resistant XR-5B fabric optional) - yellow, PVC-coated nylon or polyester

tensile stength	225 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2

Flotation - rectangular Ethafoam segments

dimensions	10.2 x 2.5 x45.7 cm	12.7 x 2.5 x137 cm	12.7 x 3.8 x137 cm	15.2 x 5.1 x137 cm
buoyancy: weight ratio	(CG-1 only)	8:1		
Connector -	Tube	Optional	Universeal	Bolts

Ballast/Lower Tension Member - 4.76 mm chain in CG and CG-3 models; 6.35 mm chain in CG-1; lead weights in CG-4

Upper Tension Member - none 6.35 mm polypropylene 6.35 mm cable none

Anchor Points - at intervals of 15.2 m in all models

Vertical Stiffeners - between flotation segments

Handholds - unspecified

OPERATIONAL DATA

Application

- rapid deployment in harbours, marinas and other sheltered environments, calm water to sea state 1
- suitable for stationary containment; CG-1 & -3 may deflect oil in low currents (less than 0.5 knot (0.9 km/h))

Oil Containment

- booms should resist planing and submerging; a full upright position with minimum skirt deflection should be possible under indicated conditions of use
- performance may deteriorate in short, breaking waves as ability to conform to crests reduces; drainage and splashover may then result
- CG-1 and CG-3 should exhibit greater stability in low currents than CG and CG-4 models

Strength and Durability

- coated fabric should have high resistance to weathering, puncture, abrasion and tearing
- heat-sealed junctures coupled with smooth sides result in booms that are not prone to snagging or tearing
- fabric is high weight and should be durable enough to survive several uses
- all booms should be capable of withstanding debris: flotation and tension members are fully enclosed and there is no stitching or protrusions

Connection System

- tube type in CG suitable for calm water; otherwise Universeal recommended for general deployment purposes and low current in particular
- bolt-through connector option is also easy to use; hook-up may be slower but disengagement is not likely
- all booms are relatively small so that interconnection of sections in water is possible
- CG-1 rope member must be tied; CG-3 upper cable should be preshackled so that tube connector is inappropriate for this model
- no tools should be necessary; preconnection of several sections prior to use should be considered

Ease of Use

- all booms are highly compactible and easily stored in depots or for transportation
- deployment, handling and retrieval should be easily and rapidly accomplished for these lightweight, smooth-sided, small booms
- all booms are easily cleaned and field-repairable

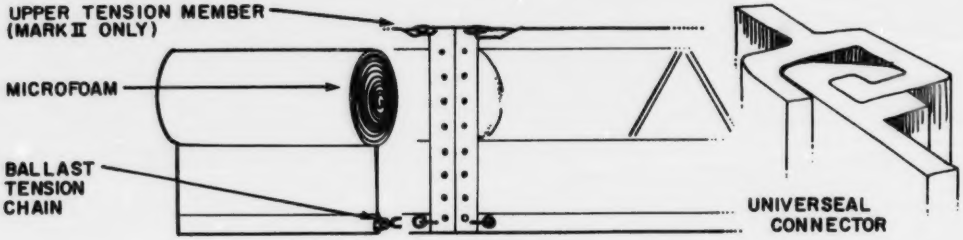
Design Features

- flat flotation segments suit boom designed for application to calm water
- boom is also fabricated well for shoreline and harbour use where debris and other floating material is present
- options of upper rope or tension cable, lower chain or lead weights, and no upper strength member contribute to versatility of the single boom concept

MARK I, II BOOM

(American Boom & Barrier Corp.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	Mark I	Mark II
overall height	30.4 to 45.7 cm	33.0 to 68.6 cm
freeboard	15.2 cm	17.8 to 22.9 cm
draught	15.2 to 30.4 cm	15.2 to 45.7 cm
section length	30.5 m	30.5 m
shipping volume - 45.7 cm Boom	0.9 m^3	0.9 m^3
Weight		
per section	76 to 82 kg	91 to 108 kg
per unit length	2.5 to 2.7 kg/m	3.0 to 3.5 kg/m

Fabric (all models - chemical resistant XR-5B fabric optional) - yellow, two available of PVC-coated yellow nylon or polyester

tensile strength	146 and 225 kg
tear strength	52 and 68 kg
cold crack temperature	-30 and -40 °C
weight	610 and 746 g/m^2

Flotation - cylindrical segments are rolled Microfoam

Connector - Universeal in all models

Ballast/Lower Tension Member -	galvanized steel chain in all models	
size	6.35 and 9.5 mm	7.9 and 9.5 mm
ultimate tensile strength	unspecified	
Top Tension Member		
type	none	wire cable
size	NA	6.35 and 7.9 mm
ultimate tensile strength	NA	unspecified

Anchor Points - at intervals of 15.2 m in all models

Other Data - no vertical stiffeners; handholds unspecified

OPERATIONAL DATA

Application

* calm, inland waters, harbours; Mark II also suitable for oil deflection in currents to 1.5 knots (2.8 km/h) when placed at angle to current
* booms should be applicable to sea state 1 and survive sea state 3
* consider Mark I & II primarily for stationary containment for work periods up to several weeks

Oil Containment

* cylindrical flotation in all models should result in high resistance to submerging and excellent wave conformity and stability
* lower tension member should prevent planing and skirt deflection
* freeboard and draft, coupled with round flotation, should be adequate to prevent splashover and drainage in inshore waters; performance may reduce in short-period breaking waves about 0.5 m in height and greater

Strength and Durability

* 746 g/m^2 coated fabric is highly durable and not suspectible to tearing, puncture or weathering; 610 g/m^2 fabric is adequate for inshore use but has lower strength qualities
* all fabric seals are heat-welded; separate compartment for ballast/tension chain is a double fabric layer
* fabric contains fire retardant and UV inhibitor
* upper cable and bottom chain in Mark II should reduce load on fabric; Mark I relies on lower tension chain only
* rolled microfoam flotation is flexible and has high impact strength; it should endure most forms of debris

Connection System

* Universeal connector allows easy and rapid section joining; no tools required
* connectors are preshackled to tension members
* connectors bolted to boom fabric over entire height for even load distribution
* Universeal connector can be used with common quick-connect types
* slotted tube option should not be selected if boom is to be used in currents exceeding 0.5 knot (0.93 km/h) (Mark II model barriers)

Ease of use

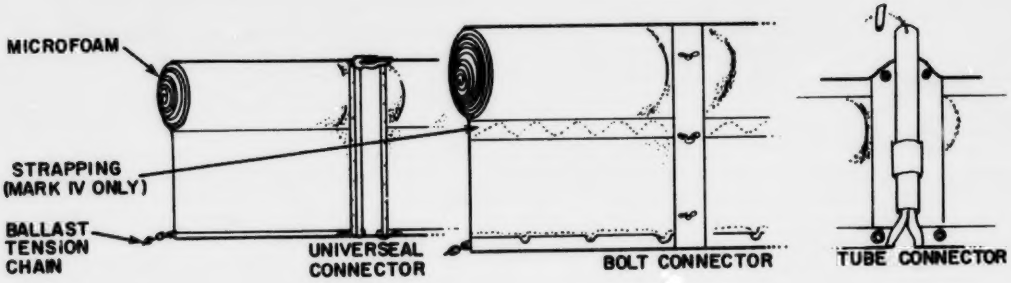
* all models are not highly compactible; the Mark II series is bulky
* weight is light-to-medium so that deployment and retrieval should be relatively quick and possible without mechanical assistance
* preshackled connectors, no protrusions and sealed chains and flotation should facilitate handling; snagging should not be a problem
* reuse potential is high and field repairability and cleanability good

Design Features

* shape and size of flotation together with interval incorporation of tension members render the booms highly suited for their designed function
* diagonal ("lambda") heat seals around flotation should allow good flexing of the boom with a minimum of stress and wear to fabric
* double chain pocket, connectors bolted to fabric and choice of materials are positive construction features

MARK III, IV SERIES (Mark III and III-A, B & C;
Mark IV and IV-A & B)
(American Boom & Barrier Corp.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	Mark III	Mark IV
overall height	66 to 121.9 cm	45.7 to 66.2 cm
freeboard/flotation	25.4 to 40 cm	15.2 to 27.9 cm
draught	40 to 91.5 cm	30.4 to 40 cm
section length	15.2 cm	15.2 cm
shipping volume	unspecified	unspecified
Weight		
per section	65 to 103 kg	unspecified
per unit length	4.3 to 6.8 kg/m	unspecified

Fabric (all models-chemical-resistant XR-5B fabric optional) - yellow, PVC-coated nylon or polyester

tensile strength	225 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2
other data	339 g/m^2 fabric available for disposable model of Mark IV Boom

Flotation - cylindrical segments of rolled Microfoam

buoyancy: weight ratio	16:1 specified for one model of Mark IV

Connector - optional tube, Universeal and bolt/plate

Tension Members - ballast/tension chain or cable of various sizes to 15.9 mm (ultimate tensile strength = 15 875 kg) in all models except Mark IV which has strapping at water line; 7.94 m cable (ultimate tensile strength = 5 440 kg) toward top edge of Mark IV-A only

Anchor Points - at intervals of 15.2 m in all models

Other Data - no vertical stiffeners; handholds unspecified

OPERATIONAL DATA

Application

* Mark III (except Mark III-C), harbour and nearshore use; Mark II-C and Mark IV, inshore operations and semi-protected bodies of water
* Mark III-A, B applicable to sea state 2-3; Mark III-C and Mark IV, sea state 1
* all booms should survive sea state 3 except Mark IV-B which is a lighter weight disposable boom and is constructed for limited exposure to waves
* all models designed for stationary mode, but also function in currents

Oil Containment

* all booms feature a minimum of 15.2 cm of round flotation which should enable them to conform well to waves and resist submerging and splashover
* the bottom tension/ballast cable together with the cylindrical foam elements should prevent planing and skirt deflection in low currents
* draught is sufficient to prevent drainage under indicated conditions of use
* Mark IV-A incorporates two tension members and has the potential for successful deployment in a current to 1.5 knots (2.8 km/h)

Strength and Durability

* except for lighter Mark IV-B Throw Away, all booms utilize a 746 g/m^2 coated fabric which should resist puncture, tearing, weathering and abrasion
* all booms should be durable enough for use in harbours and nearshore areas
* double chain pockets and minimum 9-mm tension members (except Mark IV-B) should reduce wear potential
* models feature various means of reinforcement, should also contribute to durability
* rolled Microfoam should withstand impact from most forms of debris

Connection System

* Universeal connector is easy and quick to use; in-water connection of larger Mark III-A and B models may be difficult; no tools are required
* lace connector for Throw-Away Boom is suitable for that model but means that exposure to currents or moderate sea state should be avoided
* slotted tube connector is not recommended for higher currents or waves
* preconnected shackles included (except Mark III - requires cable-to-cable attachment)

Ease of Use

* all models have low compactibility
* except for the Mark IV-B Throw Away, all booms are moderately heavy and mechanical assistance upon retrieval should be considered
* enclosed flotation and tension members facilitate deployment and retrieval
* reuse potential is high for all booms except Throw-Away model; repairability and cleaning should be possible

Design Features

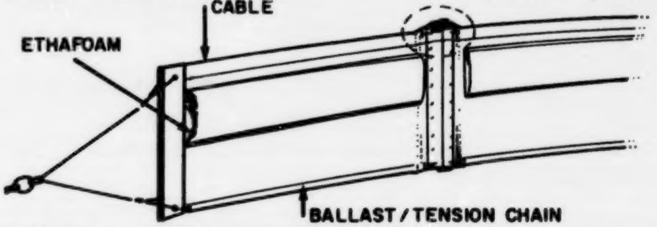
* the Mark IV Stern Boom incorporates segmented ballast; strapping is included as an additional strength member
* heavy duty connectors and reinforcement at point of attachment are features of Mark III booms
* double chain pockets are also part of the construction detail
* reserve buoyancy should be relatively high

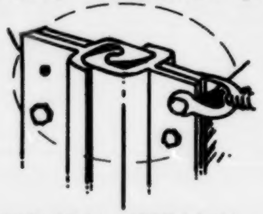
American Marine Inc.
401 Shearer Boulevard
P.O. Box 940
Cocoa, FL, 32922, USA
telephone (305)636-5783

price $US/m, as of 1 January, 1983
(brackets refer to shorter sections)

MINIMAX & MAXIMAX

Minimax $24.27 ($27.55) Maximax $48.87 ($52.15)





PHYSICAL SPECIFICATIONS (numbers in parantheses refer to shorter section lengths)

Dimensions	Minimax	Maximax
overall height	43 cm	91 cm
freeboard	15 cm	30.5 cm
draught	28 cm	61 cm
section length	30.5 (15.25) m	30.5 (15.25) m
shipping volume	0.36 (0.18) m^3	0.78 (0.39) m^3
Weight		
per section	52.5 (26.3) kg	95.5 (47.75) kg
per unit length	1.7 kg/m	3.1 kg/m

Fabric (both models) - yellow, vinyl-coated polyester

grab tensile strength	227/181 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	750 g/m^2

Flotation (rectangular shape)		
size	137 x 3.2 x 15 cm	137 x 5.7 x 30.5 cm
material type	Ethafoam in both models	
buoyancy: weight ratio	3.8:1	5.5:1

Connector - Universeal, extruded aluminum "light duty"

Ballast/Lower Tension Member -	galvanized 4.8-mm chain	galvanized 9.5-mm chain
weight	0.61 kg/m	2.3 kg/m
breaking strength	1364 kg	4808 kg

Top Tension Member (both models) - coated 56-mm cable, breaking strength 1179 kg

Vertical Stiffeners (spacing) - 1.5 m in both models

Anchor Points, Handholds (spacing) - 30.5 m (15.25) m in both models

OPERATIONAL DATA

Application

- * Minimax, calm inland waters and harbours, up to sea state 1-2
- * Maximax, harbours and nearshore situations, up to sea state 2-3
- * consider for short-term use for stationary containment and also for deflection of oil in small creeks and rivers when placed at angle to flow

Oil Containment

- * top and bottom tension members should enable booms to resist planing, submerging and skirt deflection beyond applicable sea states
- * wave conformance may deteriorate in short-period (0-2 seconds) steep waves with resultant splashover
- * freeboard and draught are adequate to prevent splashover and drainage under recommended conditions of use

Strength and Durability

- * coated fabric should resist weathering, puncture, abrasion and tearing; Minimax should be considered for lighter duty
- * tension members have high ultimate strength if loading is evenly distributed between them; Maximax should be moored so that at least ballast chain assumes loading (check bridle position)
- * flotation is durable and fabric junctures are heat-sealed

Connection System

- * Universeal connectors slide easily together end-to-end
- * no tools are required and in-water connection should be readily accomplished
- * tension members are permanently fastened to connector plates
- * may be compatible with other booms

Ease of Use

- * both booms are highly compactible for their respective sizes
- * both are relatively lightweight and easy to deploy
- * smooth flat surfaces should eliminate snagging; Maximax may be more difficult to retrieve when oiled since there are no handholds

Design Features

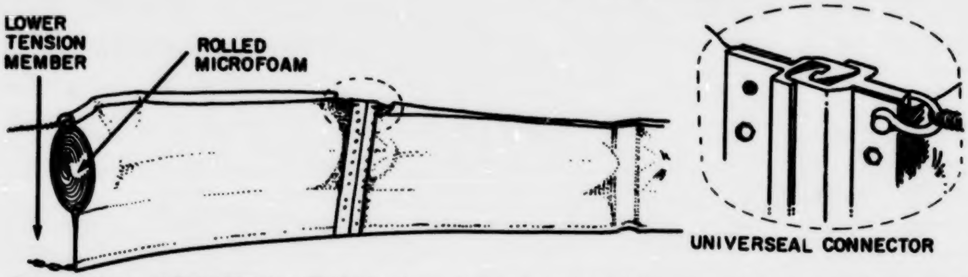
- * flotation has good reserve buoyancy and is totally enclosed within fabric
- * connector is corrosion-resistant
- * top tension cable is relatively lightweight and should not be allowed to assume total load in higher currents (f1 knot (f1.9 km/h) or winds (f20 knots (f37 km/h))

SIMPLEX, OPTIMAX, SUPERMAX

(American Marine Inc.)

price $US/m, as of 1 January, 1983 (brackets refer to shorter sections)

Simplex $27.55 ($30.83), Optimax $34.11 ($37.39), Supermax $63.63.



PHYSICAL SPECIFICATIONS (numbers in parantheses refer to shorter section lengths)

Dimensions	Simplex	Optimax	Supermax
overall height	46 cm	48 cm	91.5 cm
freeboard	15 cm	18 cm	30.5 cm
draught	31 cm	31 cm	61 cm
section length	30.5 (15.2) for all models m		15.3 cm
shipping volume	0.93 (0.47) m^3	0.93 (0.47) m^3	1.6 m^3
Weight			
per section	91 (46) kg	91 (46) kg	66 kg
per unit length	3.0 kg/m	3.0 kg/m	4.32 kg/m
Fabric (all models) - yellow, vinyl-coated polyester			
grab tensile strength	141/138 kg	227/181 kg	227/181 kg
tear strength	48/45 kg	68 kg	68 kg
cold crack temperature	-34°C	-40°C	-40°C
weight	610 g/m^2	750 g/m^2	750 g/m^2
Flotation (cylindrical in all models)			
diameter	15 cm	15 cm	30 cm
material type	16 mm rolled microfoam sheet in all models		
buoyancy: weight ratio	7:1	7:1	16.5:1

Connector - Universeal extruded aluminum; "light duty" in Simplex and Optimax; "heavy duty" in Supermax

Ballast/Lower Tension Member -	chain	chain	steel cable
dimensions	6.35 mm	7.9 mm	15.9 mm
weight	1.0 kg/m	1.57 kg/m	4.32 kg/m
breaking strength	1850 kg	3175 kg	13 608 kg
Upper Tension Member -	none	79 mm cable 4455 kg breaking strength	none

Other Features - no vertical stiffeners; handholds, anchor points at end of all models

OPERATIONAL DATA

Application

* Simplex, inshore, harbours and generally for lighter duty; Optimax, nearshore and harbours; Supermax, offshore
* Supermax applicable up to sea state 2-3; other models to sea state 2
* Optimax can also be angled for oil deflection in currents up to 1.5 knots (2.8 kg/h); other booms capable of deflection in lower currents (less than 1 knot (1.9 km/h))
* all models suitable for stationary containment for several days to weeks

Oil Containment

* tension members top and bottom plus round flotation render booms very stable; excellent resistance to planing, submerging and skirt sway
* cylindrical foam segments and interstitial flexing fabric permit excellent wave conformity
* freeboard and draught are adequate to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* coated fabric in Supermax and Optimax should resist weathering, puncture, tearing and abrasion; Simplex laminated fabric is lighter but has good strength qualities
* ballast/tension members in all models have high breaking strength; top wire rope in Optimax permits the boom's use in currents
* double fabric layer around lower strength member in all booms; rolled microfoam flotation is highly durable

Connection System

* Universeal type connectors slide together easily end-to-end
* no tools are required including for locking thumbscrew
* connectors are preshackled to tension members
* may be compatible with other booms

Ease of Use

* booms fold easily for storage but are not highly compactible because of the cylindrical flotation element
* all models are relatively lightweight and easy to deploy
* oiled boom may be more difficult to retrieve by hand since there are no handholds; however, the smooth surface should eliminate snagging

Design Features

* all metal components are corrosion-resistant
* flotation has high reserve buoyancy and is totally enclosed within fabric
* all junctures are heat-sealed
* tension cable loops have steel thimbles

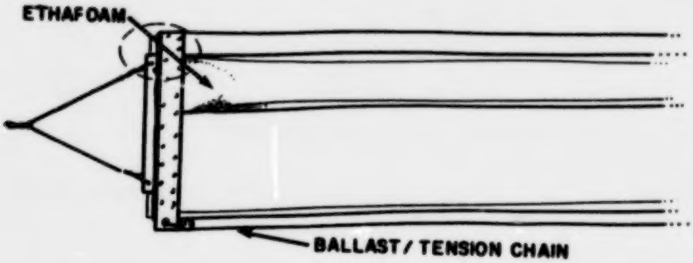
ADDITIONAL INFORMATION

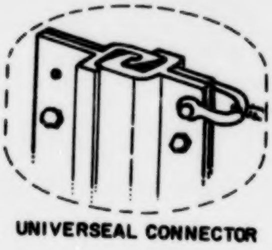
Vanderkooy, N., A. Robertson and C.J. Beckett, Evaluation of Oil Spill Barriers and Deployment Techniques for the St. Clair-Detroit River System, Technology Development Report EPS-4-EC-76-4, Environment Canada, Ottawa, Ontario (March, 1976).

PERMAFENCE (18, 24, 36, 48)
(American Marine, Inc.)

price (point of manufacture $US/m,
effective 1 December, 1982)

PERMAFENCE 18	$91.80
PERMAFENCE 24	$102.46
PERMAFENCE 36	$121.31
PERMAFENCE 48	$135.25





PHYSICAL SPECIFICATIONS (data for four models are presented)

Dimensions	18	24	36	48
overall height	46 cm	61 cm	91.5 cm	122 cm
freeboard	23 cm	30.5 cm	30.5 cm	38 cm
draught	23 cm	30.5 cm	61 cm	84 cm
section length	12.2 m	12.2 m	12.2 m	12.2 m
shipping volume	0.85 m^3	1.13 m^3	1.7 m^3	1.85 m^3
Weight				
per section	65 kg	76 kg	120 kg	142 kg
per unit length	5.3 kg/m	6.2 kg/m	9.8 kg/m	11.6 kg/m

Fabric (all models) - black and yellow, 48 mm PVC belting (optional urethane material)

tensile strength	267.7 kg/cm
tear strength	680 kg
cold crack temperature	-20°C
weight	5870 g/m^2

Flotation -	flat oval 25.4 x 7.6 cm in all models			
material type	Ethafoam in all models			
buoyancy: weight ratio	5:1	4.2:1	3.3:1	unspecified

Connector - American Marine Universeal

Ballast/Lower Tension Member - 95 mm galvanized chain weighing 2.3 kg/m; braking strength 480 kg (all models)

Anchor Points, Handholds - every 6 m (all models)

Other Data - no upper tension member or vertical stiffeners

OPERATIONAL DATA

Application

* permanent installations or long-term use at one spill site
* applicable for stationary containment up to sea state 1-2
* models 18" (45.7 cm) and 24" (61.0 cm) suitable for harbours; models 36" (91.4 cm) and 48" (121.9 cm) appropriate for more exposed conditions

Oil Containment

* the booms rigid fabric should allow maintenance of a full upright position with little submerging
* the tension chain coupled with the fabric type should allow the booms to resist planing and skirt deflection
* since flexing of both the boom material and flotation is low in the vertical plane, wave conformity should reduce accordingly and splashover should be expected in short-period breaking waves about 20 cm in height and greater
* skirt depth is sufficient to prevent drainage
* reserve buoyancy is adequate for the uses indicated

Strength and Durability

* fabric weight and strength are high; the boom should not be susceptible to weathering, tearing, puncture or abrasion
* load distribution is taken up by both the durable boom material and bottom tension chain so that wear during long-term use should be minimized
* Ethafoam flotation is sealed and should not be prone to damage by debris or oil

Connection System

* heavy duty Universeal connector is appropriate for indicated use
* connector is securely attached to boom proper by double row of bolts
* tension chain preshackles to connector
* in-water joining of sections of models 18" (45.7 cm) and 24" (61.0 cm) should be possible; preconnection on land or on vessel of larger 36" (91.4 cm) and 48" (121.9 cm) booms would be necessary
* connector is compatible with some other types

Ease of Use

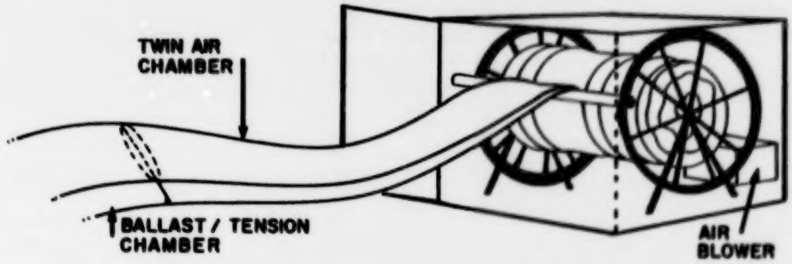
* booms are not highly compactible so that storage and transportation to spill site should be preplanned; little concern for a permanent boom
* deployment should be rapid and without snagging since booms are smooth-sided
* weight is moderately high for all booms, particularly models 36" (91.4 cm) and 48" (121.9 cm); handholds are of assistance for both deployment and retrieval although mechanical aid may be necesary for retrieval
* the non-porous belting material is easily cleaned by pressure washers and detergents

Design Features

* the shape of the flotation element suits a boom designed for permanent or long-duration use in moderately calm conditions
* the heavy duty belting material and connectors for long-term use
* incorporation of ballast chain should enhance stability in small waves; the rigidity of boom may not prevent splashover in short-period breaking waves

Biggs Wall Fabricators Ltd.
Hampden House, Arlesey
Bedfordshire SG15 6RT, England
telephone (44)(0462)731133
telex 826113 a/b BIWACO G

REEL BOOM (Biggs-Hoyle Reel Boom) price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	84 cm
freeboard	33 cm
draught	51 cm
section length	300 m (continuous, no connectors)
shipping volume	20 m^3

Weight

total package	3800 kg
per unit length	3.92 kg/m

Fabric - yellow, PVC-coated polyester or polychloroprene-coated nylon

grab tensile strength	unspecified
tear strength	158 kg
cold crack temperature	unspecified
weight	850 g/m^2

Flotation -	cylindrical, 70 cm in diameter
type	air-inflated
buoyancy: weight ratio	50:1
special features	twin 35 cm chambers continuously driven by 2.5 to 3.7 m^3/min blower

Ballast/Lower Bottom Tension Member only - wire cable (dimensions, weight unspecified)

tensile strength	15 000 kg

Other Features weight includes container, 114 kg blower-diesel, hydraulically-driven reel (diesel engine standard or optional electric motor), repair kit; navigation lights also available; no anchor points nor handholds

OPERATIONAL DATA

Application

* harbours and semi-protected bodies of water up to sea state 2-3
* consider for rapid, emergency deployment to contain stationary or slowly drifting oil for relatively short durations nearshore

Oil Containment

* the continuous round, air-filled upper chamber should provide excellent stability and wave conformity in most wave forms common to harbours
* a combination of the air-filled flotation and lower tension cable should result in resistance to planing, submerging and skirt deflection
* dimensions are adequate to prevent drainage and splashover under indicated conditions of use; reserve buoyancy is very high

Strength and Durability

* coated fabric has good resistance to weathering and tearing; high fabric weight and material type also suggest that the boom should not be prone to abrasion or puncture although the latter is a concern with the continuous flotation chambers
* the wire cable along the bottom edge should reduce the loading on the boom fabric and add to boom longevity
* sharp protrusions such as barnacle-encrusted surfaces, rocks, or as otherwise found on open-face piers should be avoided to prevent puncture
* durability of the system also depends upon a continuous maintenance and inspection program to ensure the proper functioning of the portable diesel air blower, hydraulic reel and two air-pressurized inflation hoses

Connection System

* not applicable; the boom consists of a 300 m continuous length

Ease of Use

* reel storage of boom housed in a standard 3 m container facilitates its use
* 3800 kg package weight requires preplanning deployment details
* launching involves the co-ordination of personnel and equipment at the reel (either on a vessel or dock) and upon the deploying vessel
* a trained crew working with a well maintained boom package should be capable of rapidly deploying the 300 m of containment barrier
* deployment, manoeuvring and retrieval should be carefully done to avoid puncture of the air chambers

Design Features

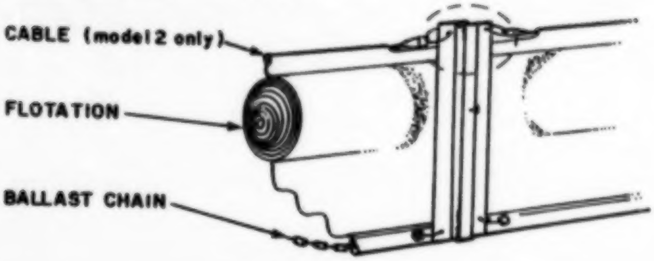
* the twin air chambers should ensure continuous flotation if puncture occurs
* lower tension cable should ensure good boom position and longevity
* hardware components require maintenance
* the fabric type and weight, boom configuration, and smooth sides should allow easy cleaning and repair

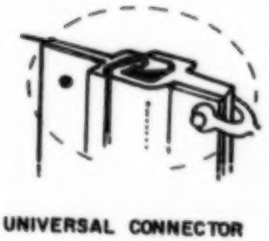
ADDITIONAL INFORMATION

Biggs Wall Fabricators Ltd. manufactures the reel. Boom suitable for the reel is produced by Hoyle Marine Limited and Avon Industrial Polymers Limited both of the UK.

Centrifugal Systems Inc.
8319 Bauman Road
Houston, TX 77022, USA
telephone (713)692-7722
telex 791-238

CSI BOOM (Model 1, 2 Series) price upon request





PHYSICAL SPECIFICATIONS

Dimensions	1-S	1-L	2S	2L
overall height	45.7 cm	60.9 cm	50.8 cm	66.0 cm
freeboard	15.2 cm	15.2 cm	20.3 cm	20.3 cm
draught	30.5 cm	45.7 cm	30.5 cm	45.7 cm
section length	30.5 cm	30.5 cm	30.5 cm	30.5 cm
shipping volume	unspecified			
Weight				
per section	81.6 kg	81.6 kg	99.8 kg	102 kg
per unit length	2.7 kg/m	2.7 kg/m	3.3 kg/m	3.3 kg/m

Fabric (all models) - high visibility yellow, nylon-reinforced PVC

tensile strength	227 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2

Flotation - cylindrical elements 15.2 cm diameter (series 1), 20.3 cm diameter (series 2)

material type	closed-cell urethane sheets concentrically wound
buoyancy: weight ratio	unspecified

Connector - universal connector, aluminum

Ballast/Lower Tension Member -	chain used in all models			
size	6.35 mm	6.35 mm	7.94 mm	7.94 mm
ultimate strength	1361 kg	1361 kg	4535 kg	4535 kg

Top Tension Member - none in series 1; 7.94 mm cable series 2, located 5.1 cm above flotation

Other Data - no vertical stiffeners; handholds, anchor points unspecified

OPERATIONAL DATA

Application

- Model 1 series, protected bodies of water including lakes, ponds and estuaries; Model 2 series, harbours and semi-protected bodies of water
- Models 1 and 2 both applicable to sea state 1-2 and to stationary containment; Model 2 can be angled for oil deflection in currents up to 1.5 knots (2.8 km/h)
- both booms are suitable for short-to-medium term use (several days to one week); avoid exposure for long periods to higher sea states

Oil Containment

- cylindrical urethane flotation should result in excellent wave conformity and stability since it is highly flexible
- the tension member(s) and flotation should allow the booms to assume a full upright position with no skirt deflection or planing; Model 2 series booms should provide successful oil deflection in currents with no submerging occurring below 1.5 knots (2.8 km/h); Model 1 can be applied to lower currents (1 knot (1.8 km/h) or less)
- dimensions are adequate in both booms to prevent drainage and splashover under conditions of use indicated

Strength and Durability

- coated fabric resists weathering, abrasion, puncture and tearing
- ultimate strength of the tension members is relatively high, particularly in the Model 1; with even load distribution on the tension members, durability should increase substantially
- all fabric junctures are thermally sealed and the flotation enclosed so that snagging should not be a problem; algacide is an optional feature
- the concentrically-wound urethane sheets which serve as flotation elements should be highly resilient and capable of withstanding most forms of debris

Connection Systems

- the universal connectors are preshackled to tension members and are easy and quick to use; no tools are required to join sections
- a thumbscrew secures each connector; it may loosen upon prolonged exposure to continuous small wave forms unless wired closed
- connection should be possible both on land and in water for all boom models

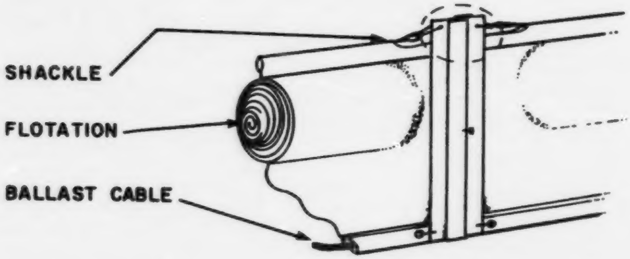
Ease of Use

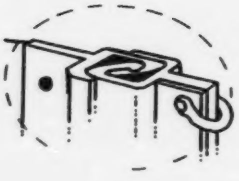
- although flotation elements are flexible, the boom does not appear to be highly compactible for storage and transportation purposes
- rapid interconnection of sections and deployment of this smooth-sided boom
- booms are of light-to-moderate weight; mechanical assistance for retrieval and transportation should be considered
- booms should be easily cleaned and repaired

Design Features

- metal components include galvanized steel cable (vinyl sheathed) and ballast chain, aluminum connectors, and shackles all which are corrosion-resistant
- chain pocket is single layer of fabric
- flotation is highly flexible and resilient
- cable (in Model 2) and ballast chain are high strength

CSI BOOM (Model 3 Series) price upon request
(Centrifugal Systems Inc.)





UNIVERSAL CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	3XS	3S	3L
overall height		76.2 cm	91.4 cm
freeboard	30.5 cm	30.5 cm	30.5 cm
draught	30.5 cm	45.7 cm	60.9 cm
section length	15.2 m	15.2 m	15.2 m
shipping volume	unspecified		
Weight			
per section	61.2 kg	62.3 kg	63.5 kg
per unit length	4.0 kg/m	4.1 kg/m	4.2 kg/m

Fabric (all models) - high visibility yellow, nylon-reinforced PVC

tensile strength	227 kg
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2

Flotation (all models) - cylindrical elements 30.5 cm in diameter, closed-cell urethane sheets concentrically wound

buoyancy: weight ratio	unspecified

Connector - universal connector, aluminum, reinforced attachment via cable shackle and thimble

Ballast/Lower Tension Member - 15.9 mm cable in all models; ultimate strength = 15 873 kg

Top Tension member - none

Other Data - no vertical stiffeners; handholds, anchor points unspecified

OPERATIONAL DATA

Application

* harbours and semi-protected bodies of water, up to sea state 2
* consider for stationary containment for work periods of short-to-medium term (several days to one week); 30.5 cm flotation element should also permit deflection of oil in lower currents (less than 1 knot (1.8 km/h))

Oil Containment

* 30.5 cm cylindrical flotation plus chain ballast/tension member should render boom highly stable and result in excellent wave conformity
* boom should resist submerging, planing and skirt deflection
* freeboard and draught are of adequate size to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* coated fabric resists weathering, abrasion, puncture and tearing
* very high ultimate strength of the bottom tension cable should allow substantial load on the boom if the strength member assumes loading
* all fabric seams are thermally sealed and the flotation enclosed so that the potential for snagging is reduced
* the flotation elements are concentrically-wound urethane sheets which should be highly resilient and capable of withstanding impact from most forms of debris

Connection System

* no tools are required to join the universal connectors which are preshackled to tension members; they are easy and quick to use
* a thumbscrew secures each connector; in continuous harbour chop, it may back off unless wire closed
* connection should be possible on land and on water

Ease of Use

* a standard length of 15.2 m at a weight of about 4 kg/m allows lift to be made by two people
* the boom is not highly compactible and with its 30.5 cm flotation requires preplanning for storage and transportation
* both interconnection of sections and deployment should be rapid; retrieval may require mechanical assistance

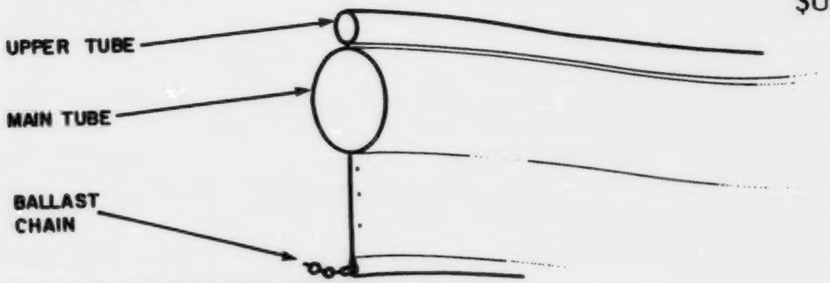
Design Features

* galvanized steel cable (vinyl-sheathed), aluminum connectors, and thimbles and shackles are all corrosion-resistant
* chain pocket is single layer of fabric
* concentrically-wound closed-cell urethane sheets are flexible and not prone to puncture
* bottom cable is of very high strength
* anchor points can be incorporated into the boom

Conplan International AB
Kronobergsgatan 16
SE-352 33 Vaxjo, Sweden
telephone (46)(0)470-451 00
telex 522 69 a/b CONPLAN S

SAFE BARRIER

price (point of manufacture
$US/m effective 1983) $120



PHYSICAL SPECIFICATIONS

Dimensions	
overall	117.5 cm
freeboard	27.5 cm
draught	90.0 cm
section length	as requested
shipping volume	1 m^3 per 100 m
Weight	
per unit length	4 kg/m
Fabric - red, orange or other as requested,	PVC-coated polyester
tensile strength	60/50 kg/cm
tear strength	25/30 kg
cold crack temperature	-30°C
weight	700 g/m^2
Flotation - twin butyl cylindrical tubes which are filled by compressed air	
diameter	upper 7.5 and lower 20.0 cm
buoyancy: weight ratio	30:1

Connector - Safe Bridge AB (Sweden); plastic, aluminum or stainless steel

Ballast/Lower Tension Member - 9.5 mm galvanized steel chain weighing 1.4 kg/m

Top Tension Member -	none

Special Features - submerged boom can be kept at sea floor until needed

Vertical Stiffeners -	none
Anchor Points (spacing) -	10 to 15 m
Handholds -	supplied upon request

OPERATIONAL DATA

Application

* harbours and ship terminals as permanent installation; submerged when not in use and air-inflated when needed
* should be applicable to sea state 2 and in low currents (less than one knot)
* appears to be designed primarily for stationary containment when short-term use (several hours to several days) is anticipated

Oil Containment

* twin buoyancy chambers coupled with the lower tension/ballast chain should result in excellent wave conformity, boom stability and resistance to submerging; reserve buoyancy is very high
* assuming even load distribution at the connectors and the appropriate length of tension cable, the boom should not plane or undergo skirt deflection
* freeboard and draught are of adequate size to prevent splashover and drainage in nearshore conditions

Strength and Durability

* PVC-coated polyester is UV-resistant and has adequate tensile strength with moderate tear strength; fabric weight is relatively high at 700 g/m^2
* steel chain is appropriate for harbour use
* butyl inner tube should reduce potential for air loss from impact with debris
* inflation dependent upon air compressor as well as on initial submergence and resurfacing so that no damage to boom occurs

Connection System

* continuous length of boom usually used
* connectors available, but configuration, durability and ease of use unknown
* if multiple sections are required, consideration should be given to interconnec-tion of each of the low and high air pressure supplies

Ease of Use

* the boom is highly compactible and easily stored or transported
* once in place, the boom should be easily inflated
* use of the air compressor in sub-freezing temperatures requires water (or ice)-free air lines
* smooth sides should prevent snag-free use once boom is inflated; in deflated condition care should be taken to prevent tearing of fabric
* weight is relatively low but mechanical assistance may be needed to lift sections 50 m or more in length

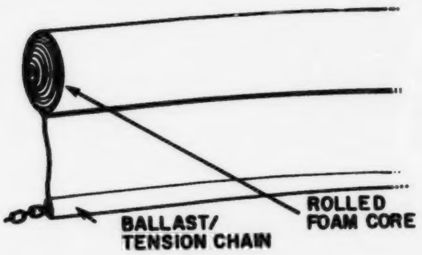
Design Features

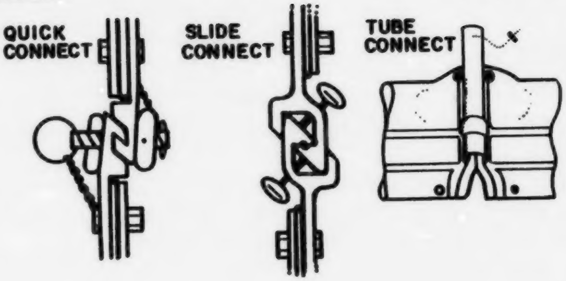
* use of the boom involves an air reducer which creates low and high pressure air streams from a single source of air
* the high buoyancy: weight ratio should permit use of the boom in many wave forms including short breaking waves
* submergence of the boom when it is not in use requires precheck of launching site to ensure that proper deployment can be achieved

Containment Systems Corp.
P.O. Box 1390
658 So. Industry Road
Cocoa, FL, 32922, USA
telephone (305)632-5640
telex 566535 a/b CSCCOCA

4x6, PERFORMANCE, HARBOR BOOMS

price upon request





PHYSICAL SPECIFICATIONS

	4x6	Performance	Harbor
Dimensions			
overall height	25.7 cm	45.7 cm	91.5 cm
freeboard flotation	10.2 cm	15.2 cm	30.5 cm
draught	15.2 cm	30.5 cm	61 cm
section length	15.2 m	30.5 m	15.2 m
shipping volume	0.22 m^3	0.88 m^3	1.6 m^3
Weight			
per section	24 kg	73 kg	60 kg
per unit length	1.6 kg/m	2.4 kg/m	3.9 kg/m
Fabric			
type	various fabrics, unspecified		
grab tensile strength	141/138 kg	141/138 kg	227/181 kg
tear strength	48/45 kg	48/45 kg	68/68 kg
cold crack temperature	-34°C	-34°C	-40°C
weight	610 g/m^2	610 g/m^2	750 g/m^2

Flotation - cylindrical rolled foam core in all models
buoyancy: weight ratio unspecified

Connector - slotted tube slides over sealed rope in each end of 4 x 6; choice of quick or slide connect in Performance and Harbor Booms fabricated from extruded aluminum

Ballast/Lower Tension Member Only - galvanized chain in all models

	4x6	Performance	Harbor
size	6.35 mm	6.35 mm	9.5 mm
breaking stength	2132 kg	2132 kg	4400 kg

Other Data - no vertical stiffeners; handholds, anchor points not specified

OPERATIONAL DATA

Application

* 4x6-inshore, calm water; Performance Boom-protected bodies of water, light currents; Harbor Boom-semi-protected bodies of water such as harbours
* 4x6 is applicable in sea state 0-1; Performance Boom suitable up to sea state 1-2; Harbor Boom should work in sea state 2 and survive sea state 3
* consider all booms primarily for stationary containment; defletion of oil in light currents (less than 1 knot (1.8 km/h)) should also be possible if booms are angled toward flow
* Performance and 4x6 Booms are lighter duty ensuring deployment periods of several days to one week; Harbor model should endure longer work periods

Oil Containment

* all booms have round flotation element and bottom tension chain so that excellent wave conformity and stability should result
* all booms should be capable of resisting submerging and planing; skirt deflection should not occur in light currents if tension member assumes loading
* dimensions are adequate to prevent splashover and drainage

Strength and Durability

* fabric of Harbor Booms is high strength and should be durable; expect slightly less durability from 610 g/m^2 laminated fabric of 4x6 and Performance Booms
* tension member is larger in Harbor model than in Performance and 4x6 Booms; the galvanized chain is of adequate size for most nearshore applications
* concentrically-wound foam core is highly resilient and should withstand debris

Connection System

* Quick and Slide Connectors are easy and rapid to use; they require no tools and are appropriate for the Performance and Harbor Booms; the Slide Connector should provide more positive interconnection for booms used in higher sea states
* Tube Connector should suit the 4x6 Boom for deployment in protected waters; disjunction could occur in higher sea states upon prolonged exposure
* in-water connection of all booms should be possible if required

Ease of Use

* the 4x6 Boom has good compactibility and should fold easily for storage and transportation; large floats of the other booms render them bulkier
* all booms are light-to-moderately light weight so that deployment, handling and retrieval should be readily accomplished
* the booms are smooth-sided and should be easy to clean and repair; snagging should not be a problem

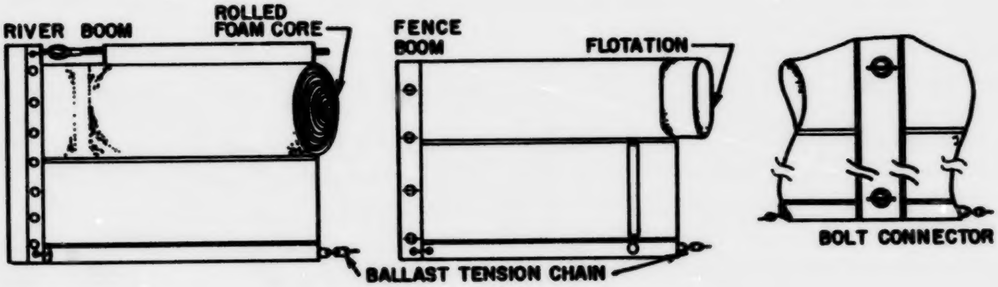
Design Features

* the tension member and flotation are enclosed within heat-sealed fabric
* all metal components are corrosion-resistant
* connectors for Performance and Harbor Booms are bolted to fabric; rope end on 4x5 model slots into tube connector

RIVER, FENCE BOOMS

(Containment Systems Corp.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	River	Fence
overall height	45.7 cm	45.7 cm
freeboard/flotation	15.2 cm	15.2 cm
draught	30.5 cm	30.5 cm
section length	30.5 m	30.5 m
shipping volume	0.88 m^3	0.77 m^3

Weight		
per section	95 kg	50 kg
per unit length	2.8 kg/m	1.6 kg/m

Fabric (both models)	
type	unspecified
grab tensile strength	227/181 kg
tear strength	68/68 kg
cold crack temperature	-40°C
weight	750 g/m^2

Flotation - 15.2 cm cylinder of rolled foam in River, 5 x 15.2 cm, plank in Fence

buoyancy: weight ratio	unspecified

Connector - Quick or Slide connector; bolted plates optional in Fence; extruded aluminum construction

Ballast/Lower Tension Member - 6.35 mm galvanized chain breaking strength 2132 kg in River; lead ballast weights only (weight unspecified) in Fence

Top Tension Member - (River Boom only) 8 mm galvanized wire rope, breaking strength 4445 kg

Other Data - no vertical stiffeners; handholds, anchor points unspecified

OPERATIONAL DATA

Application

* both booms designed for stationary containment in nearshore conditions; River Boom is also applicable to oil deflection in currents to about 1.5 knots (2.8 km/h)
* Fence Boom suitable in sea state 0-1; River Boom should contain and/or deflect oil up to sea state 1-2
* deployment for several days to several weeks should be possible

Oil Containment

* River Boom should exhibit superior wave conformity and resistance to submerging than Fence Boom due to its 15.2 cm cylindrical flotation elements and chain
* Fence Boom should provide adequate oil containment in calm, stationary conditions; lead ballast should allow boom to maintain a full upright position
* freeboard and draught are of sufficient size to prevent splashover and drainage under indicated conditions of use
* River Boom should not plane nor undergo skirt deflection in currents if tension chain distributes load evenly

Strength and Durability

* coated fabric highly durable, should resist weathering, puncture and tearing
* all fabric junctures are thermally sealed
* tension chain in River Boom is high strength
* concentrically-wound foam sheets provide resilient, flexible flotation in River Boom; foam planks (Fence Boom) should also withstand debris

Connection System

* Bolt Connector is appropriate for long-term use; Quick or Slide Connector should be adequate for calm conditions; in-water connections are possible
* no tools required for interconnection of sections; attention should be given to connectors to ensure thumbscrews do not back off in continuous small waves
* connectors in River Booms are preshackled to tension member

Ease of Use

* Fence Boom is highly compactible and folds readily for storage and transportation
* River Boom is less compactible because of the round flotation so that preplanning its transportation may be required
* both booms are light to moderately light in weight; River Boom may require mechanical assistance for retrieval because of its standard 30.5 length
* both booms are smooth-sided; this facilitates handling and cleaning

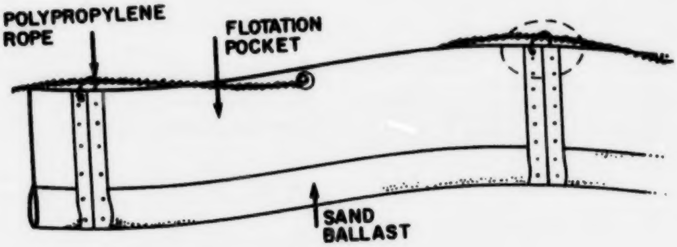
Design Features

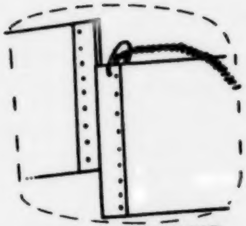
* galvanized chain in River Boom, aluminum connectors are corrosion-resistant
* tension members and flotation are totally enclosed within boom fabric
* the heavier duty coated fabric in smaller booms should permit several reuses
* select more compactible Fence boom where storage space during transportation is a concern and shoreline or calm water use is anticipated

Conwed Corporation
Sorbent Products
P.O. Box 43237
St. Paul, MN, 55164, USA
telephone (612)221-1144

price upon request

DISPOSABLE BOOM




SLIDING CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	
overall height	50.8 cm
freeboard	25.4 cm
draught	25.4 cm
section length	2.1 m
shipping volume (two sections)	0.09 m^3
Weight	
per section	9.2 kg
per unit length	4.3 kg/m
Fabric - white, closed-cell polyethylene foam in double layer	
tensile strength (kg)	45 kg
tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified
Flotation -	top pocket of boom 6.35 mm fabric (polyethylene foam)
buoyancy: weight ratio	unspecified
Connector -	extruded plastic, sliding male and female fittings
Ballast -	sand in polyethylene foam pouches along bottom edge of boom
Tension Member -	top only; external polypropylene rope laces through grommets at top of boom and interconnects through snap and loop
Other Data -	designed to be discarded after use; no vertical stiffeners, bottom tension member, handholds, or anchor points

OPERATIONAL DATA

Application

- calm inland waters and enclosed areas such as marinas, dikes and ditches, sea state 0-1
- designed for short-term deployment; boom is used once in a spill and discarded
- consider for use in stationary mode in very low wave and wind conditions

Oil Containment

- boom should provide satisfactory containment in very calm water only
- wave conformity and stability are not expected to be as good as conventional booms; some flop-over of the freeboard section may occur if uneven loading occurs (wind or current affecting one section of the boom when it is held in a catenary)
- planing and skirt deflection may occur in low currents
- freeboard and draught should be of sufficient size for calm water use; ballast should result in boom assuming an upright position

Strength and Durability

- polyethylene foam is not highly resistant to puncture, abrasion and tearing; the boom has been conceived as a use-and-discard product
- sewn fabric junctures may tear if boom catches on projections, sharp objects
- sand ballast could be lost if puncture below water line occurs
- individual boom sections are short and can be easily replaced if damaged
- short-term deployment should be possible if care is taken not to above boom

Connection System

- extruded plastic sliding connectors are easy and quick to use
- although the connectors are firmly fastened, tearing of the fabric at the point of attachment may occur if the boom is stressed beyond a reasonable degree
- tension member snaps together at section ends
- in-water connection is possible
- male and female connectors must be properly aligned; no tools are required

Ease of Use

- boom is lightweight and highly compactible; it can be easily stored and transported
- damaged sections can be quickly replaced
- used boom should be discarded; cleaning and repair are not required or practical
- may be compatible with many hazardous materials
- smooth sides should eliminate snagging; care must be taken to avoid tearing

Design Features

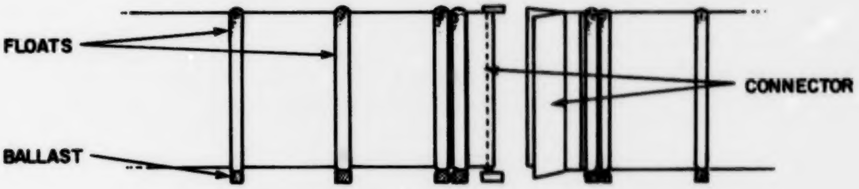
- boom is double layer of foam which is unsinkable
- section lengths of 2.1 m result in easy handling
- boom is designed as a low cost, low strength unit that can be easily and quickly used over the short-term and then discarded

Covalca Plastici SpA
Floating Systems Division
00040 Pomezia (Roma), Italy
telephone (39)(06)9121351
telex 613407 a/b COVALCI

65/625 & 65/640

price (point of manufacturer
$US/m effective 1-1-83)

65/625 $110/m
65/640 $85/m



PHYSICAL SPECIFICATIONS (both models - differences for 65/640 noted in parantheses)

Dimensions	
overall height	65 cm
freeboard	22 cm
draught	43 cm
section length	25 m (other lengths upon request)
shipping volume	0.72 m^3
Weight	
per section	147 (103) kg
per unit length	5.88 (4.12) kg/m
Fabric - yellow, PVC-coated polyester	
tensile strength	180 kg/cm
tear strength	unspecified
cold crack temperature	-40°C
weight	1200 g/m^3

Flotation - vertical cylinders 6 cm in diameter every 0.25 m (0.40 m), expanded PVC

buoyancy: weight ratio	2.5:1
Connector -	marine-type "AISI 316"
Tension Members -	none

Ballast - lead weights 7 x 8 cm long at bottom of flotation cylinders providing 3.4 kg/m (2.1 kg/m)

Vertical Stiffeners -	flotation elements serve as stiffeners
Handholds -	none
Anchor Points -	located as required

OPERATIONAL DATA

Application

- harbours, lakes and general inshore use in semi-protected areas
- applicable for stationary containment up to sea state 1-2
- consider for use both as permanent installation boom and for emergency deployment in the event of an accidental spillage in semi-protected waters

Oil Containment

- boom should retain full upright position in calm water and in longer period waves due to lead ballasted flotation and heavy skirt material
- wave conformance may deteriorate in steeper, shorter period waves since 0.4 of the flotation normally remains above the water's surface and would not respond as quickly as horizontally-oriented flotation elements
- submerging, drainage and splashover are unlikely if the boom is used in harbours under indicated conditions of use
- skirt deflection and planing may occur if the boom is subjected to current (1 knot (1.8 km/h)) and wind (10 knots (18.5 km/h)) acting on it from opposite directions

Strength and Durability

- coated polyester has very high fabric weight and should adequately resist weathering, puncture, abrasion and tearing
- PVC floats are highly resilient and should not be affected by debris
- boom is durable enough to withstand use at permanent installations or at least several emergency deployments involving long-term cleanup

Connection System

- steel connection mechanism provides positive attachment; tools are required
- interconnection of sections on land is suggested due to weight of boom
- extra flotation at connector should adequately support it; point of attachment of connector to boom appears to be well secured

Ease of Use

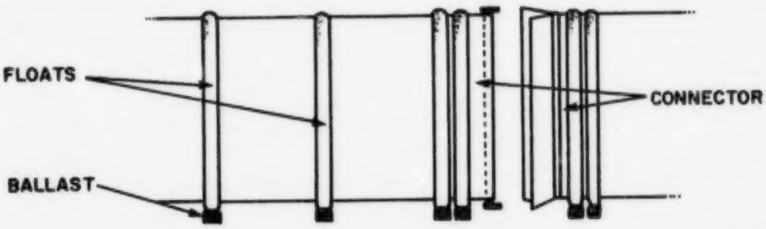
- boom is relatively compactible for its size and weight and should be easily stored
- boom has high section weight and mechanical assistance should be considered for deployment and retrieval; hardware is available from Covalca
- vertical flotation with protruding ballast at ends may catch on some dock faces and care should be taken to avoid damage upon launching and retrieval
- boom should be easily cleaned and repairable

Design Features

- boom has no tension member but depends upon fabric to assume load
- simple construction consists of ballasted floats and single fabric sections
- survivability in high sea states (3-4) should be possible due to good fabric
- circular floating platform allows rapid deployment and recovery of the boom

OFFSHORE 85/1025
(Covalca Plastici SpA)

price (point of manufacture
$US/m effective 1-1-83)
$160



PHYSICAL SPECIFICATIONS

Dimensions

overall height	85 cm
freeboard	36 cm
draught	49 cm
section length	25 m (other lengths upon request)
shipping volume	1.48 m^3

Weight

per section	465 kg
per unit length	18.6 kg/m

Fabric -	yellow, PVC-coated polyester
tensile strength	180 kg/cm
tear strength	unspecified
cold crack temperature	-40°C
weight	1200 g/m^2

Flotation - vertical cylinders 10 cm in diameter every 0.25 m expanded PVC

material type	expanded PVC
buoyancy: weight ratio	1.7:1

Connector -	marine type "AISI 316"
Tension Members -	none

Ballast - lead weights at bottom of flotation cylinders 12 cm in diameter x 15 cm long providing 12.6 kg/m

Vertical Stiffeners -	flotation elements serve as stiffeners
Handholds -	none
Anchor Points -	located as required

OPERATIONAL DATA

Application

* harbours, lakes and general nearshore use involving semi-protected waters
* applicable for stationary containment in sea states 0 to 2
* consider for use both as permanent installation boom at ship terminals and for emergency deployment where long-term use may be required

Oil Containment

* boom should retain full upright position due its ballasted flotation and heavy skirt material in calm water and in longer period waves
* wave conformance may deteriorate in steeper, shorter period waves if water rises against the vertically-oriented flotation member
* submerging, drainage and splashover are unlikely for this 85 cm boom if applied under the indicated conditions of use

Strength and Durability

* coated polyester fabric is heavy at (1200 g/m^2) and should adequately resist weathering, puncture, abrasion and tearing
* PVC floats are highly resilient and should not be damaged by debris
* boom is sufficiently durable to withstand use as permanent installation or multiple uses involving emergency deployments for long-term periods

Connection System

* hand tools are required to interconnect sections with the steel locking mechanism; it provides positive attachment
* on-land or on-vessel interconnection must be made due to boom's high weight
* additional flotation toward each connector should adequately support the boom; attachment of connector to boom fabric appears to be well secured

Ease of Use

* boom is relatively heavy for its size, but should store readily
* mechanical assistance should be planned for both deployment and retrieval due to the boom's bulk and weight
* the ballasted ends of the vertical flotation units protrude; care should be taken to avoid catching these on dock faces other surfaces when launching and recovering the boom
* boom should be easily cleaned and repaired

Design Features

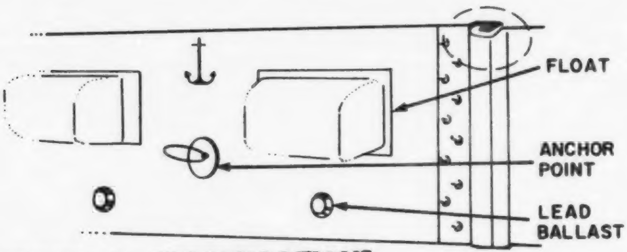
* boom has no tension members; it depends on the fabric to assume all loading
* boom construction is simple and sound; ballasted flotation is fastened to a single layer of fabric
* boom material is highly durable permitting survival in sea states 3-4
* unique circular floating platform allows rapid deployment and recovery

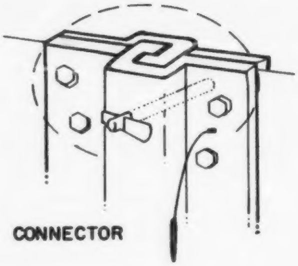
Crowley Environmental Services Corporation
3400 East Marginal Way South
Seattle, Washington 98134, USA
telephone (206)682-4898
telex 32-1229

PETRO BARRIER 24" and 36"

price (point of manufacture
$US/ft effective 1-1-83)

Petro Barrier 24" $26.00
Petro Barrier 26" $36.50





PHYSICAL SPECIFICATIONS

Dimensions	24 in (61 cm)	36 in (91.4 cm)
overall height	61 cm	91 cm
freeboard	27.9 cm	30.5 cm
draught	33 cm	61 cm
section length	30.5 m	30.5 m
shipping volume	4.5 m^3	7.1 m^3
Weight		
per section	209 kg	318 kg
per unit length	6.8 kg/m	10.4 kg/m

Fabric (both models) - black, polyester fibre-reinforced PVC

grab tensile strength	267.7 kg/cm
tear strength	680 kg
cold crack temperature	unspecified
weight	4068 g/m^2
special features	impregnated with anti-fouling agent

Flotation - attached float approximately 46 x 25 x 15 cm polyethylene with hard skin and closed-cell foam core

buoyancy: weight ratio	2.1:1	2.0:1
spacing	39 cm	15 cm

Connector - reinforced nylon universal slide, stainless steel pin

Ballast - 0.45 kg lead weights; 48 in 24 inch (61 cm) model and 96 in 36 inch (91.4 cm) model; optional chain

Anchor Points (spacing) - 7.6 m from each end, indicated by stencil

OPERATIONAL DATA

Application

- permanent installations and emergency spill deployment in harbours particu-larly in the vicinity of docks and ship terminals
- 24 in (61 cm) functional in up to sea state 1-2 and 36 in (91.4 cm) useful to sea state 2-3; booms should survive sea state 5
- suitable for long-term use in stationary situations

Oil Containment

- rigid fabric plus float configuration, ballast should produce full upright position
- wave conformance should be satisfactory in longer period waves; performance may deteriorate in steeper, breaking seas as the boom bridges between crests
- dimensions are adequate to prevent drainage and splashover in most smaller wave forms (9-30 cm) with the 36 in (91.4 cm) model exhibiting higher sea state capability
- booms should resist submerging as well as skirt deflection and planing under indicated conditions of use; opposing wind and current may result in some leaning of boom

Strength and Durability

- very high-weight fabric resists weathering, tearing, puncture or abrasion
- load is distributed over entire boom height (no tension members included)
- molded polyethylene flotation with foam core should resist impact from debris
- connectors are made of nylon and firmly attached to boom fabric via double row of bolts; disengagement at points of connection is unlikely
- long-term use and/or many reuses should be possible

Connection System

- nylon universal slide connectors provide low-friction, end-to-end connection
- stainless steel pin locks connectors securely together
- bolted attachment should distribute load evenly with low chance of disengagement
- may be compatible with other systems

Ease of Use

- single section weights of 209 and 318 kg for the 24 in (61 cm) and 36 in (91.4 cm) booms, respectively, require mechanical means for the deployment and retrieval of the booms
- booms not compactible; preplanning storage and transportation suggested
- booms should be easily cleaned
- care must be taken to prevent snagging of flotation units which may occur during launching and recovery

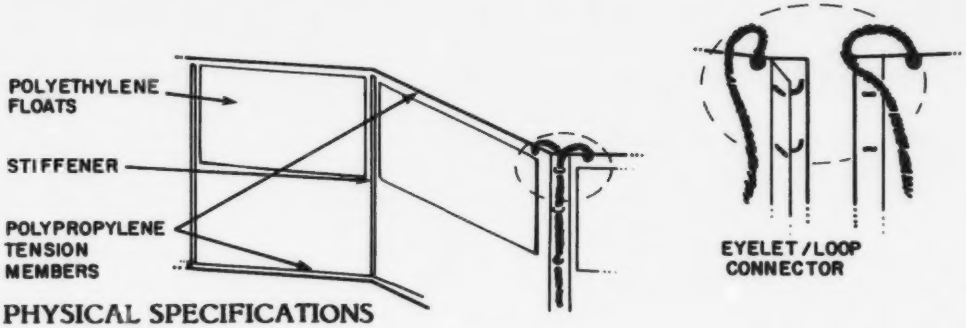
Design Features

- booms utilize highly durable materials for the fabric, floats and connectors
- all materials are non-corroding in seawater; fabric resists marine growth
- anchor points are firmly secured; their locations are clearly indicated by stencils marked above them toward top edge of boom
- floats are permanently attached to boom fabric by six bolts

Diab-Barracuda AB
Repslagaregatan, Box 201
S-312 01, Laholm, Sweden
telephone (46)0430 128 00
telex 38042 a/b DIBOL S

BARRACUDA OIL BOOM

price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	70 cm
freeboard	23 cm
draught	47 cm
section length	25 m
shipping volume	0.32 m^3 (with floats) 0.05 m^3 (without floats)

Weight

per section	45 kg
per unit length	1.8 kg/m

Fabric - signal orange, PVC-coated polyethylene sheet in double layer

grab tensile strength	unspecified
tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified

Flotation - spheroid, ~20 cm in diameter

type	hard polyethylene
special features	52 floats each at 1-m intervals attach by snap hook to either side of one 25-m section

Connector - two rows of eyelets and a single row of metallic loops are held in place by extension of the tension members

Tension Members - polypropylene rope stiched into fabric along top and bottom edges

Ballast - round iron weights sewn into boom along bottom edge, weight unspecified

Vertical Stiffeners - fibreglass rods are stitched between the two layers of fabric at intervals of about 0.5 m

OPERATIONAL DATA

Application

* harbours and other semi-protected bodies of water, sea state 1
* consider for stationary containment of oil for short-term use (up to several days); can be discarded after use

Oil Containment

* floats, stiffeners and rope tension members coupled with iron ballast should allow boom to assume a full upright position in calm water
* although the boom should not submerge, planing and skirt defection may occur in moderate currents (0.5 - 1 knot (0.9 - 1.8 km/h)) and opposing winds (10 knots (18.5 km/h))
* under indicated conditions of use, the boom should not undergo drainage and splashover; floats provide the boom with adequate wave-riding capability

Strength and Durability

* double layer of fabric is used but this is likely lightweight material and may be susceptible to tearing and abrasion
* cardboard sandwiched between fabric layers will deteriorate if wet
* fabric junctures are thermally welded together
* except for fibreglass stiffeners, the boom's construction from polyethylene sheet incorporating cardboard and rope tension members suggests lower durability; however, the boom should be adequate for inshore use over shorter work periods
* molded polyethylene floats should withstand debris and would be reusable

Connection System

* the eyelets and loops are easy and quick to use; no tools are required
* connectors should secure ends under indicated conditions of use
* proper alignment of ends must be made so that sections can be connected
* disengagement could occur if boom is left out in higher sea states
* connectors are not likely to be compatible with other systems

Ease of Use

* boom is very compactible; it readily folds for storage and transportation
* floats quickly attach to boom for deployment; care must be taken that they do not snag on projections
* boom is lightweight; it can be quickly deployed, briefly used, and discarded
* polyethylene floats are easily cleaned and can be reused

Design Features

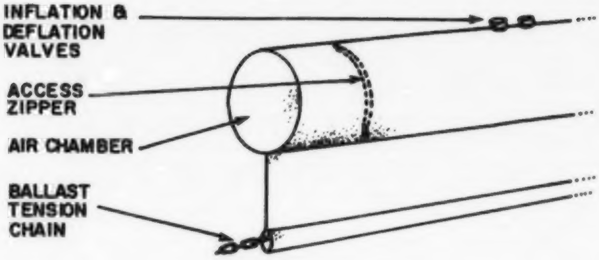
* connection system incorporates reinforced metal loops and eyelets
* use boom can be disposed of by burning
* iron ballast is sewn into boom between the fabric layers
* each connector presents a triple layer of fabric and should be leak-proof

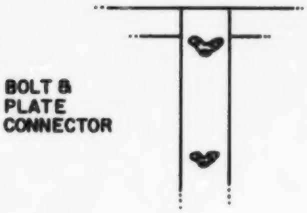
Environetics Inc.
9824 Industrial Drive
Bridgeview, IL, 60455, USA
telephone (312)430-4740

BOA BOOM I

price (point of manufacture
$US/ft effective 2-1-83)

$25.25





PHYSICAL SPECIFICATIONS

Dimensions

overall height	71 cm
freeboard	22 cm
draught	49 cm
section length	3.05 (or 15.2) m
shipping volume	0.0283 (or 0.1416) m^3

Weight

per section	8.38 (or 42) kg
per unit length	2.75 kg/m

Fabric - yellow, polyester-reinforced PVC

grab tensile strength	136 kg
tear strength	50 kg
cold crack temperature	-40°C
weight	615 g/m^2

Flotation - air-inflated cylindrical chamber 25 cm in diameter

buoyancy: weight ratio	unspecified

Connector - bolted plates, aluminum

Ballast/Lower Tension Member Only - 7.1 mm galvanized steel chain weighing 1.07 kg/m; breaking strength = 2280 kg

Anchor Points - 3 every 7.62 m

Other Data - no top tension member, handholds, nor vertical stiffeners; zipper connectors and storage reel no longer available

OPERATIONAL DATA

Application

* harbours and semi-protected bodies of water
* applicable up to sea state 2 for work periods of several days to one week
* consider for stationary containment; should also be capable of halting the spread of oil in light currents (about 0.5 knots (0.9 km/h) and less)

Oil Containment

* cylindrical, air-filled flotation should enable boom to conform well to waves, resist submersion and prevent splashover
* flotation plus bottom tension chain should prevent planing and skirt deflection in calm and low current situations as the boom assumes a full upright position; overall stability of the boom should be very good
* draught is adequate to avoid drainage under indicated conditions of use

Strength and Durability

* reinforced coated fabric should resist weathering, puncture, abrasion and tearing
* tension member, fabric weight are size appropriate for intended use
* loss of flotation could occur upon puncture

Connection System

* bolted plates provide positive attachment with disengagement unlikely
* preconnection on land or on vessel would probably be necessary due to the weight of the boom, inflation required, and nature of the interconnection
* plate and tension chain should assume a substantial proportion of the load acting on the boom

Ease of Use

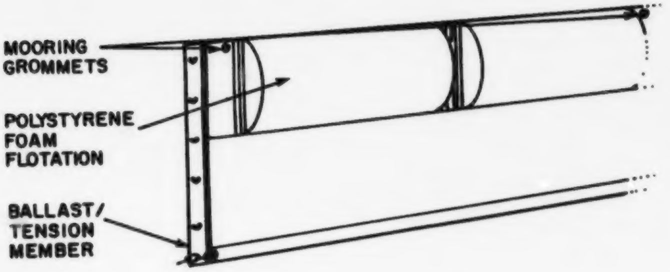
* buoyancy chambers must be inflated prior to deployment; a source of air is needed
* sections are short and collapsible so that this highly compactable boom utilizes relatively small storage space
* smooth sides should permit snag-free deployment; the procedure may require several hours, however, since individual chambers must be air-filled and connection plates must be bolted together
* care must be taken to avoid punctures from shap protrusions on old docking structures and rocks, barnacles, etc.
* boom should be easy to clean and to repair

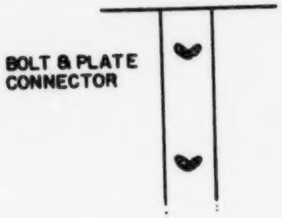
Design Features

* while not specified, buoyancy: weight ratio is likely very high
* boom includes anchor points spaced at regular intervals
* optional 15.2 m sections would be more practical for most deployments
* all fabric seams are dielectrically (at microwave range energy levels) welded
* coated polyester fabric should resist moisture wicking and bacterial action
* connector plate now replaces zipper fasteners which were found to jam upon exposure

BOA BOOM II and III
(Environetics Inc.)

price (point of manufacture $US/ft effective 2-1-83)	
Boa Boom I	$9.50
Boa Boom II	$8.25





PHYSICAL SPECIFICATIONS

	Boa Boom II	Boa Boom III
Dimensions		
overall height	71 cm	40.6 cm
freeboard	22 cm	12.7 cm
draught	49 cm	27.9 cm
section length	3.05 (or 15.2) m	3.05 (or 15.2) m
shipping volume	0.28 (or 1.42) m^3	0.13 (or 0.63) m^3
Weight		
per section	8.62 (or 43.1) kg	6.8 (or 34.0) kg
per unit length	2.83 kg/m	2.23 kg/m
Fabric (both models) -	yellow, polyester-reinforced PVC	
grab tensile strength	136 kg	
tear strength	50 kg	
cold crack temperature	-40°C	
weight	615 g/m^2	
Flotation - cylindrical expanded polystyrene flotation, totally enclosed, in both models		
diameter	25 cm	15.2 cm
buoyancy: weight ratio	61.5:1 (both models)	

Connector - bolted plates, aluminum

Ballast/Lower Tension Member Only - 7.1 mm galvanized steel chain weighing 1.07 kg/m; breaking strength = 2280 kg

Anchor Points - 3 per section each at 7.62 m intervals

Other Data - no top tension member, vertical stiffeners, handholds

OPERATIONAL DATA

Application

- Boa Boom II - harbours, semi-sheltered areas; Boa Boom III - inshore, calm water
- Boa II is applicable in up to sea state 2 and Boa III in up to sea state 1
- both booms are suitable for short- and medium-term use (several days to several weeks) in emergency spills
- consider for stationary containment or deflection of oil in currents less than 1 knot (1.8 km/h) when placed at angle to flow

Oil Containment

- cylindrical flotation elements should ensure that booms conform well to waves
- foam elements plus bottom tension chain should prevent planing and skirt deflection in low sea states and low currents; good stability and a full upright position should result with no submerging
- dimensions are sufficient to avoid splashover and drainage under indicated conditions of use
- buoyancy: weight ratio is very high so that freeboard should be well maintained

Strength and Durability

- coated PVC fabric should resist weathering, puncture, abrasion and tearing; fabric weight is appropriate for inshore use
- galvanized chain has adequate ultimate strength for its intended purpose
- expanded polystyrene floats are fully enclosed and should withstand debris
- all fabric seams are dielectrically welded and should not separate upon prolonged exposure to continuous wave activity

Connection System

- bolted aluminum plates provide positive interconnection of sections with the potential for disengagement unlikely
- on-land or on-vessel preconnection would be preferable due to the nature of connectors and the weight of the booms
- tension chain is fastened to connector to further simplify the joining of sections

Ease of Use

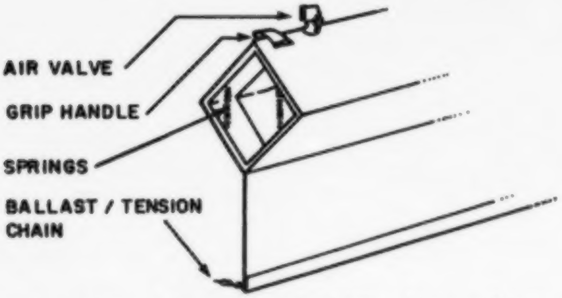
- booms are not compactible; preplanning storage and transportation is required
- short sections would require numerous interconnections; optional 15.2 m lengths might be more suitable for many spill situations excluding streams, small rivers and other very narrow bodies of water
- smooth-sized construction should permit deployment without snagging
- booms should be easy to clean and repair

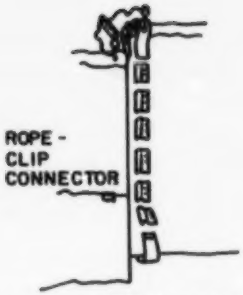
Design Features

- reserve buoyancy is very high; wave response should be excellent
- consider optional 15.2 m lengths in lieu of shorter 3 m sections for spill situations where preconnection is not likely
- all fabric seams are welded; junctures should not normally disengage
- coated fabric should resist moisture wicking and bacterial action

Expandi Systems AB
S-91400 Nordmaling, Sweden
telephone (46)0903 110 30
telex 54047 a/b JOSEPH S

EXPANDI-BOOM Models 2000 & 3000 (Fast-current & Harbour Boom) price upon request





PHYSICAL SPECIFICATIONS (parantheses denote urethane/PVC model 3000)

	Model 2000	Model 3000
Dimensions		
overall height	56 cm	77 cm
freeboard	23 cm	30 cm
draught	33 cm	47 cm
section length	25 m	25 m
shipping volume	0.20 m^3	0.306 m^3
Weight		
per section	63 kg	75 kg
per unit length	2.52 kg/m	3.0 kg/m
Fabric (also consult manufacturer) -	International Orange (both models)	
	nylon PVC	nylon/PVC/polyurethane (urethane)
grab tensile strength	unspecified	
tear strength	56 kg/cm	60 (80) kg/cm
cold crack temperature	-30°C	-30°C
weight	650 g/m^2	800(850) g/m^2
Flotation - diamond shape in both models; self-inflates through one-way check valves as pliable frame springs open, suitable for reel storage		
buoyancy:weight ratio	14.8:1	17.7:1
Connector -	flexible clips and rope-filled male connector	
Ballast/Lower Tension Member Only -	(chain in both models)	
size	6.35 mm	6.35 mm
breaking strength	2590 kg	2590/3300 kg
Handhold (spacing) -	2.8 m	4.3 m
Anchor Points (spacing) -	8.3 m	8.3 m
Other Data -	no vertical stiffeners, top tension member	

OPERATIONAL DATA

Application

* harbours and other semi-protected bodies of water for deployment periods of several days to several weeks
* type 2000 applicable to sea state 1-2; type 3000 suitable up to sea state 2
* designed for stationary containment; can also be angled for oil deflection in currents up to 1 knot (1.8 km/h) or used in sweeping operations

Oil Containment

* bottom tension member in combination with buoyancy chamber should render boom highly stable; excellent resistance to planing and skirt deflection
* unique flotation provides very good wave conformity with no submerging
* freeboard and draught are of adequate size to generally prevent splashover and drainage under indicated conditions of use; washover and under has been observed in choppy seas with steep 0.6 m waves

Strength and Durability

* coated fabric resists weathering, puncture, abrasion, and tearing
* fabric seams are thermally sealed and not prone to disengagement
* polypropylene frames shape upper chamber and are pliable and durable
* springs in buoyancy chamber may have to be replaced periodically
* boom may lose buoyancy if air-filled element is punctured

Connection System

* system of clips and rope-thickened ends is easily together on land or on vessel; in-water joining of lengths of boom is not practical
* connections are secured by passing a locking pin through links from adjoining sections of the bottom tension chain
* disengagement may occur if in high sea state (4-5) for prolonged time

Ease of Use

* highly compactible booms fold easily for storage and transportation
* pliable frames with springs, one-way check valves allow fast deployment
* booms are low weight; handholds should permit manual retrieval without mechanical assistance
* vacuum apparatus can be used for quicker deflation using special valves
* boom has no large protrusions but care must be taken to avoid snagging hand grips and anchor rings during launching and recovery
* boom is easily patched and cleaned

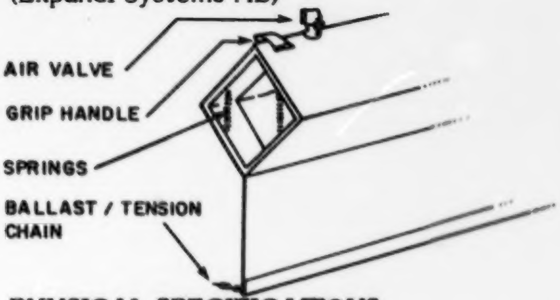
Design Features

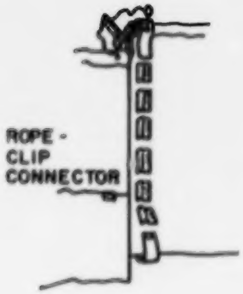
* boom has high reserve buoyancy
* valves incorporate an anti-splash bonnet
* fabric patches reinforce diagonal seams
* springs are rust-proof but may loosen upon repeated use
* high strength chain combines well with unique air chamber

ADDITIONAL INFORMATION

Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Oil Containment Booms, Report No. CG-D-78-78, United States Coast Guard, Washington, D.C. (November, 1978).

EXPANDI-BOOM TYPES 4300 & 6300 price upon request
(Sea and Ocean Boom)
(Expandi Systems AB)





PHYSICAL SPECIFICATIONS

Dimensions	Type 4300	Model 6300
overall height	110 cm	175 cm
freeboard	45 cm	70 cm
draught	65 cm	105 cm
section length	15.2 m	15.2 m
shipping volume	0.27 m^3	0.52 m^3

Weight		
per section	80 kg	255 kg
per unit length	5.26 kg/m	16.78 kg/m

Fabric (also consult manufacturer)	International Orange nylon/PVC/urethane	nylon/urethane
grab tensile strength	unspecified	
tear strength	173.2 kg/cm	267.7 kg/cm
cold crack temperatue	-30°C	-30°C
weight	850 g/m^2	1150 g/m^2

Flotation - diamond shape in both models; self-inflates through one-way check valves as pliable frame springs open

buoyancy: weight ratio	22.8:1	12.9:1

special features boom collapses so that it is suitable for reel storage

Connector - flexible clips and rope-filled male connector

Ballast/Lower Tension Member - chain in both models

size	9 mm	unspecified
breaking strength	7500 kg	1600 kg

Middle Tension Member (model 6300 only) - nylon band, breaking strength = 10 tons (9.1 tonnes)

Handholds (spacing) -	4.3 m	4.3 m
Achnor Points (spacing) -	7.5 m	7.5 m
Other Data -	no vertical stiffeners, top tension member	

OPERATIONAL DATA

Application

- Type 4300 - harbours and semi-protected areas; Type 6300 - offshore waters
- Type 4300 - applicable to sea state 2; Type 6300 - suitable to sea state 3
- designed for stationary containment and deflection of oil in currents to about 1 knot (1.8 km/h); usage periods of several weeks are possible

Oil Containment

- air-filled chamber plus bottom tension chain should result in good stability with excellent resistance to planing and skirt deflection
- booms should conform well to waves and not submerge
- freeboard and draught are sized appropriately for indicated conditions of use; splashover may occur in steep, breaking waves as chop develops

Strength and Durability

- high weight coated fabrics should resist weathering, puncture, abrasion and tearing
- fabric junctures are thermally sealed; disengagement is unlikely
- nylon tension member in model 6300 adds to ultimate strength of boom
- ballast chain provides excellent load-bearing capability
- should puncture occur, boom could lose a portion of its buoyancy

Connection System

- steel clips and rope-thickened end must be preconnected on land or on vessel; no tools are required
- locking pin secures connection when it is passed through end links of adjacent ballast chain lengths
- connection may disengage upon prolonged exposure to higher sea states; ballast chain should remain continuously linked because of locking pin

Ease of Use

- booms are compactible and so facilitate storage/transportation needs
- Type 4300 boom is of moderately high weight; mechanical assistance for launching and retrieval should be considered (and for heavier Type 6300)
- system of pliable frames, springs and one-way check valves allows fast deployment when boom is launched from reel
- vacuum should be applied to recovered boom to remove air when packing
- although angular, booms have no separate protrusions except for anchor rings; snagging should not be a problem if care is exercised during deployment

Design Features

- nylon band in Type 6300 should enable boom to function in currents
- valves can be covered with anti-splash bonnet
- rust-proof springs may loosen upon repeated use
- booms have moderately high reserve buoyancy

ADDITIONAL INFORMATION

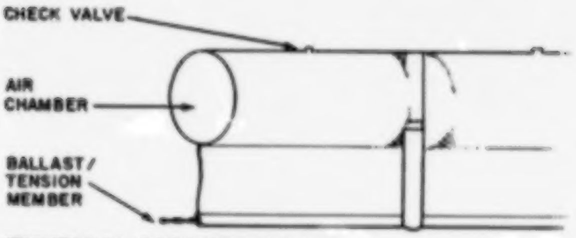
Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Containment Booms, Report No. CG-D-78-78, United States Coast Guard, Washington, D.C. (November, 1978).

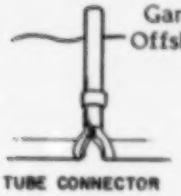
Gamlen Europe S.A.
62-70, rue Yvan Tourgueneff
78380 Bougival, France
telephone (33)(3)9189234
telex 695 355

GAMSPILL & OFFSHORE

price (point of manufacture
$US/m effective 20-1-83)

Gamspill 1500 $83
Offshore 1500 $162





PHYSICAL SPECIFICATIONS

	Gamspill		Offshore	
Dimensions	1000	1500	1000	1500
overall height	60 cm		120 cm	
freeboard	23 cm		43 cm	
draught	37 cm		77 cm	
section length	25 m		25 m	
shipping volume	1.25 m^3		2.3 m^3	
Weight				
per section	100 kg	112.5 kg	200 kg	225 kg
per unit length	4 kg/m	4.5 kg/m	8 kg/m	9 kg/m
Fabric -	orange, PVC-coated polyester			
tensile strength	118 kg/cm	120/116 kg/cm	60 kg/cm	120/116 kg/cm
strength	unspecified	40/80 kg	unspecified	40/80 kg
cold crack temperature	unspecified			
weight	630 g/m^2	1200 g/m^2	630 g/m^2	1200 g/m^2
Flotation - cylindrical chambers self-inflate via one-way check valves in all models				
diameter	25 cm		45 cm	
buoyancy: weight ratio	15.5:1		13.8:1	
Connector -	slotted tube			
Ballast/Lower Tension Member Only -				
type	6.35 mm iron chain		19 mm iron chain	
weight	2 kg/cm		6 kg/cm	
breaking strength	unspecified for both models			
Vertical Stiffener -	none			
Anchor Points -	as needed			
Handholds (spacing)	5 m		3 m	

OPERATIONAL DATA

Application

- * Gamspill - inland waters, lakes, rivers; Offshore - more exposed locations
- * Gamspill is applicable up to sea state 1-2 and Offshore up to sea state 2-3; both booms should survive exposure to higher sea states but are intended for deployment in more moderate conditions for durations of several days to one week; consider 1500 models for long-term use
- * both booms are designed primarily for stationary containment but should be capable of deflecting oil when angled in currents up to about 1 knot (1.8 km/h)

- * both booms are designed primarily for stationary containment but should be capable of deflecting oil when angled in currents up to about 1 knot (1.8 km/h)

Oil Containment

- * air-filled cylindrical flotation in combination with bottom tension chain should result in high stability and wave conformance with good resistance to submerging
- * boom should not plane nor should skirt deflection occur in currents of up to 1 knot (1.8 km/h)
- * freeboard and draught are sized adequately for indicated conditions of use

Strength and Durability

- * coated fabric has very high weight and tear strength in 1500 models and should resist weathering, puncture and abrasion; fabric in 1000 models is adequate for less severe conditions of use
- * continuous tension member should assume large portion of loading
- * should fabric be punctured, loss of buoyancy could occur in affected segment

Connection System

- * slotted tube coupler interlocks sections quickly and readily
- * disengagement may be possible in higher sea states (4-5) or in excessive currents (over 2 knots) if prolonged exposure should occur
- * Gamspill can be connected either on land or in water with the latter requiring calm conditions; Offshore model should be preconnected because of size and weight
- * interconnection of tension members is required

Ease of Use

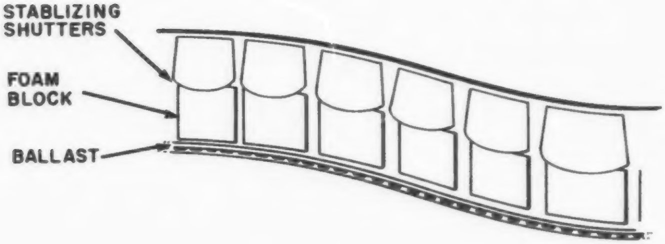
- * Gamspill is medium weight; handholds assist deployment and recovery
- * Offshore model is heavy; mechanical assistance is suggested
- * booms are self-inflating and smooth-sided; launching should be quick and snag-free if care is taken not to puncture air chambers as the boom unfolds
- * booms are compactible and can be collapsed for storage/transportation

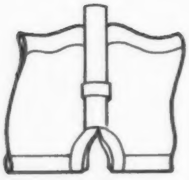
Design Features

- * fabric junctures retain internal hoops to maintain boom's cylindrical shape
- * section ends are reinforced with brass grommets
- * booms have high reserve buoyancy
- * handholds are included as are anchor points along enclosed ballast
- * polyethylene-coated stainless cables are available in lieu of iron chains

HIGH SEA GUARD
(Gamlen Europe S.A.)

price (point of manufacture
$US/m effective 20-1-83)
$179




TUBE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions

overall height	110 cm
freeboard	45 cm
draught	65 cm
section length	10 m
shipping volume	3.23 m^3 per 50 m

Weight

per section	140 kg
per unit length	14 kg/m

Fabric - orange and grey, PVC-coated polyester (three ply)

tensile strength	360 kg/cm
tear strength	227 kg/cm
cold crack temperature	unspecified
weight	630 g/m^2

Flotation - internal flexible foam blocks approximately 45 x 65 cm; also self-inflating stabilizing chambers on either side composed of PVC-coated polyester

buoyancy: weight ratio	5.3:1

Connector -	slotted tube

Ballast - iron chain links in pockets along skirt hem

weight	7.8 kg/m

Vertical Stiffeners - flexible plastic tubes spaced 45 cm apart

Anchor Points (spacing) -	50 m
Other Data -	no tension members, handholds

OPERATIONAL DATA

Application

- harbours, semi-protected areas and open coastal reaches
- applicable up to sea state 2; should be considered for deployment periods of several days to several weeks
- designed for stationary containment of oil

Oil Containment

- air-filled shutters should result in good wave conformity, resistance to submerging
- in currents of 1 knot or more, some planing and skirt deflection may occur; this should not be a problem under indicated conditions of use
- skirt and freeboard heights are adequate to resist drainage and splashover

Strength and Durability

- fabric is of high tear strength and moderate weight; the boom is suitable for less severe conditions over short-to-medium term deployment periods
- main body of boom including fabric-covered foam elements separated by plastic tubes should be durable; system of lateral buoyancy shutters may be susceptible to damage upon sustained exposure to choppy seas and higher sea states (4-5)
- fabric is thermally welded and is resistant to weathering by UV, ozone, hydrocarbons and seawater
- ballast consists of individual iron links enclosed within boom; these should be well retained by the high tear-strength material

Connection System

- slotted tube connectors can be readily and quickly used to join sections
- disengagement of boom from connector may occur in higher sea states (4-5) or excessive currents (over 2 knots) if prolonged exposure occurs
- on land or on vessel preconnection is recommended; the size and weight of the boom may preclude in-water interconnections
- since there is no tension member, connection is further simplified
- tube connector is not compatible with most other connectors

Ease of Use

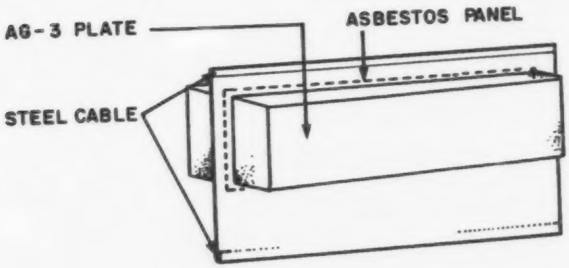
- shutters fold downward when not in use; boom is relatively bulky for its size so that preplanning is required for storage/transportation
- boom is high weight; mechanical assistance should be considered for handling
- shutters project upon deployment and care is required to prevent snagging
- powered reel with variable speed drive available for storage

Design Features

- construction detail includes individual fabric pockets for each flotation element and ballast component
- anchor points are included every 50 m
- thermally-welded fabric seals form pockets and hold shutter retainer rings
- vertical stiffeners are fabricated from durable, flexible plastic tubes
- outrigger buoyancy elements activate without valves or the need for mechani-cal inflation

FIRE GUARD Standard and Heavy Duty
(Gamlen Europe S.A.)

price (point of manufacture
$US/m effective 20-1-83)
standard unspecified
Heavy Duty $211



PHYSICAL SPECIFICATIONS

	Standard	Heavy Duty
Dimensions		
overall height	33 cm	45 cm
freeboard	16 cm	22 cm
draught	17 cm	23 cm
section length	5 m	5 m
shipping volume	unspecified	7.14 m^3/50 m
Weight		
per section	30 kg	60 kg
per unit length	6 kg/m	12 kg/m

Fabric (both models) - red and white, PVC-coated flexible 3-ply 96% asbestos panels between 3-mm AG-3 plates

tensile strength	10 kg/cm
tear strength	8 kg/cm
cold crack temperature	unspecified
weight	1200 to 1300 g/m^2
special features	fine-link metal screen separates asbestos layers; PVC coating protects asbestos before combustion

Flotation - two square section tubes of 2-mm AG-3 attached (with 1 cm gap) to either side of AG-3 plates

	Standard	Heavy Duty
buoyancy: weight ratio	unspecified	2.4:1

Connector - quick connect

Ballast - none

Tension Members - stainless steel cable top and bottom, size unspecified

tensile strength (kg)	3250 (each cable)

Other Data - handholds, anchoring points unspecified

OPERATIONAL DATA

Application

* applicable to protected bodies of water including lakes, harbours and terminals
* stationary containment of oil for in situ combustion for several hours
* suitable for sea states 0-1
* designed as semi-disposable boom

Oil Containment

* rigid flotation units coupled with top and bottom tension members should allow boom to maintain full upright position and resist submersion
* planing and skirt deflection should not occur under indicated conditions of use
* during and subsequent to the combustion of oil, containment could be adversely affected as the condition of the boom deteriorates; continuous wave action could also result in breakdown of interconnecting panels
* freeboard and draught are of adequate size

Strength and Durability

* asbestos layer on floats and PVC-coated asbestos panels between floats will be destroyed during fire; float plates may buckle but should survive combustion
* wet asbestos may break down after burns when exposed to water, particularly in continuous wave action; retention capability of boom may then be lost
* tension members, flotation and metal screen supporting asbestos should remain intact for duration of burn to provide continuity to boom; escape of oil is still a likely possibility once the PVC layer and asbestos are lost
* flotation should survive limited combustion periods

Connection Systems

* quick connect couplings are easily slid into position
* interconnection on land or on vessel is recommended prior to deployment
* preplanning boom assembly, i.e. space and time requirements, should be considered
* connectors should be checked after burns; few problems should occur

Ease of Use

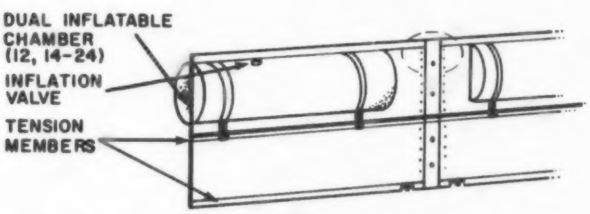
* boom is bulky, storage/transportation requirements should be planned
* the weight of each section allows handling by two persons; mechanical assistance should be considered for lengths of several sections
* launching of boom should be conducted in a controlled, careful manner so that it is not damaged prior to the burn
* towing of the boom into position should be possible with standard hardware
* repair of the boom by the manufacturer following a burn may be possible

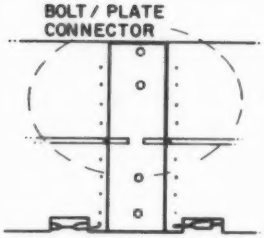
Design Features

* boom has adequate reserve buoyancy
* PVC material plus asbestos has high fabric weight but relatively low strength
* fine-link metal screen supports asbestos and PVC layers
* 1 cm separation between floats and the vertical plates to which these are attached should allow heat dissipation
* lighter duty, fire-resistant boom is also available

Goodyear Aerospace Corporation
Engineered Fabrics Division
Rockmart, GA, 30153, USA
telephone (404)684-7855

SEA SENTRY 9-18, 12-24 and 14-24 price upon request





PHYSICAL SPECIFICATIONS

	9-18	12-24	14-24
Dimensions	Pier Boom	Offshore Boom	Offshore Boom
overall height	68.6 cm	91.4 cm	96.5 cm
freeboard	22.9 cm	30.5 cm	35.6 cm
draught	45.7 cm	61 cm	61 cm
section length	20.7 m	16.8 m	16.8 m
shipping volume (two sections)	1.26 m^3	2.55 m^3	2.55 m^3
Weight			
per section (includes chain)	164 kg	212 kg	220 kg
per unit length	7.9 kg/m	12.7 kg/m	13.1 kg/m

Fabric (all models) - black with yellow (9-18 only) or orange stripes, rubber-impregnated nylon

grab tensile strength	272/272 kg
tear strength	23 kg
maximum storage temperature	48.9°C

	9-18	12-24	14-24
Flotation			
no. of chambers/section	6	5	5
diameter	21.6 cm	30.5 cm	35.6 cm
length	2.9 m	3.1 m	3.1 m
type	single (in 9-18) or dual air-inflated chambers		
buoyancy: weight ratio	3.9:1	4.6:1	6.5:1

Connector - stainless steel nut and bolt assembly

Ballast - 6.35 mm (9-18 only), 9.53 mm galvanized chain along bottom

Tension Members - (at water line except as noted)	9.53 or 6.35 mm galvanized chain 2313 kg working load	two 12.7 mm Kevlar ropes in jacket, 7710 kg tensile strength; bottom 12.7 mm chain 14 739 kg tensile strength in model 14-24
handles (no. per chamber)	1	6 (3 on top and 3 at bottom)

OPERATIONAL DATA

Application

* Pier Boom - permanent installations and emergency use nearshore; Offshore Booms - harbours, semi-protected waters and offshore
* Pier boom applicable up to sea state 1-2; offshore models up to sea state 2-3
* consider all booms primarily for short-term use (several days or more): for both stationary containment as well as deflection of oil in currents up to about 1 knot (1.8 km/h)

Oil Containment

* cylindrical flotation units should result in very good wave conformity and stability
* submergence of freeboard may occur in high currents (2-3 knots (3.7 to 5.6 km/h))
* ballast chain and tension members should prevent planing and skirt deflection in currents less than 1 knot (1.8 km/h)
* freeboard and draught are sized adequately for indicated conditions of use

Strength and Durability

* impregnated fabric has high tensile strength, should resist weathering and abrasion; low tear strength may result in tearing or puncture if care is not taken
* vulcanized fabric junctures should reduce potential of snagging and disjunction
* Kevlar tension members and large-size galvanized steel chain should allow offshore models to survive very high sea states if these assume the load acting on the boom
* offshore models incorporate dual inflation chambers to decrease risk of boom sinking should damage occur

Connection System

* stainless steel nut and bolt assembly resists corrosion
* bolts and plates require prior connection on land; simple hand tools required
* tension members can be preshackled to connector plates
* towing assembly including plate attachment can be secured to standard boom section
* optional bridle assembly allows sections of boom to be connected to skimmers

Ease of Use

* booms are not highly compactible but can be stored in reusable wooden containers
* booms' high weight necessitates mechanical assistance for deployment and retrieval
* source of compressed air is required for deployment; preplanning chamber inflation and interconnection of sections should be conducted
* smooth-sided booms should be easy to deploy, clean and repair
* extra precaution should be taken to ensure against fabric tears

Design Features

* offshore booms incorporate multiple tension members and air chambers
* metal handles, lifting points allow easy manoeuvring
* all booms have good reserve buoyancy
* enclosed chain and Kevlar members should prevent snagging

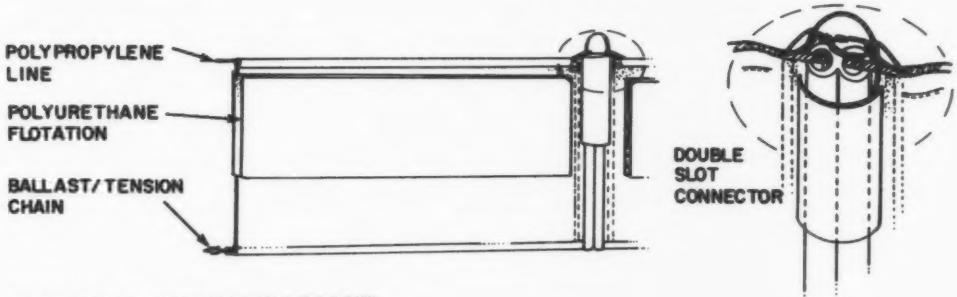
ADDITIONAL INFORMATION

The Sea Sentry 14-24 was tested at OHMSETT November 15-24, 1982. Preliminary data were not available for publication.

Hurum Engineering Ltd.
981 rue Pierre Dupuy - Suite 124
Longueuil, Quebec J4K 1A1 Canada
telephone (514)463-0160
telex 055-60312 a/b HURUM ENG

HURUM 18" (45.7 cm) DISPOSABLE BOOM

price (point of manufacture
$Cdn/ft effective 1-9-82)
$5.45



PHYSICAL SPECIFICATIONS

Dimensions

overall height	45.7 cm
freeboard	15.2 cm
draught	30.5 cm
section length	15.2 m
storage volume	0.18 m^3

Weight

per section	25.5 kg
per unit length	1.7 kg/m

Fabric (prototype only -- see also Operational Data) - orange, woven polyethylene

tensile strength	90.7 kg
tear strength	29.5 kg
cold crack temperature	unspecified
weight	170 g/m^2

Flotation - rectangular 61 x 18 x 5 cm closed-cell polyurethane

buoyancy: weight ratio	unspecified

Connector - extruded aluminum; double round slots; handle; flotation

Ballast/Lower Tension Member -	7.9 mm galvanized steel chain
breaking strength	3289 kg

Top Tension Member - 6.35 mm polypropylene line

breaking strength	553 kg

Other Data - no vertical stiffeners, handholds; anchor points at either section end; optional fabrics and cylindrical flotation

OPERATIONAL DATA

Application

* emergency use in protected waters including harbours, up to sea state 1
* consider primarily for stationary containment for periods of several days to one week; deflection of oil in low currents (0.5 knot (0.9 km/h) or less) should also be possible

Oil Containment

* foam flotation plus top and bottom tension members allow boom to assume full, upright position
* submerging, planing and skirt deflection no problem, since boom remains stable
* wave conformity is adequate for indicated conditions of use; later model utilizing cylindrical elements improves wave response
* freeboard and draught prevent splashover and drainage to sea state 1; cylindrical flotation option raises capability to sea state 1-2

Stength and Durability

* prototype utilized 170 g/m^2 polyethylene; later model employs 270 g/m^2 Fabrene which has superior qualities to resist weathering, puncture, abrasion and tearing
* two tension members add significantly to overall strength by assuming loading
* multiple rows of stitching adequately seal fabric of this "disposable" boom
* prototype used single layer chain pocket; commercial product's double fabric layer in/ hem is superior
* polyurethane foam is flexible and sufficiently durable to withstand debris

Connection System

* double-slotted connector slides easily over thickened section ends (in-water connection)
* tension members must be shackled separately to complete connection
* connectors include handle and flotation; the latter prevents loss at sea
* connections will not disengage in sea states beyond boom's containment capability

Ease of Use

* boom is highly compactible and minimizes transportation and storage needs
* light weight and smooth sides facilitate handling including launching and retrieval
* Fabrene material of commercial product is easily repaired and cleaned
* several reuses of the boom should be possible

Design Features

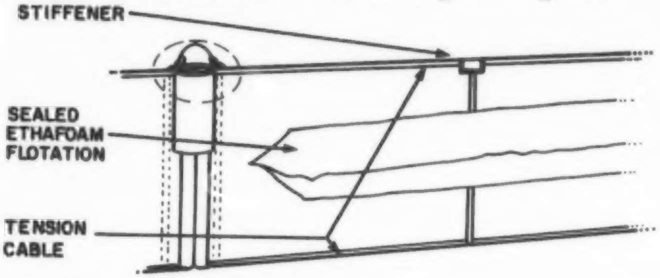
* 270 g/m^2 Fabrene material of commercial product is superior to 170 g/m^2 polyethylene fabric; offers higher strength qualities and allows boom reuse
* bottom tension chain and upper polypropylene line assume tensile loading and contribute substantially to stability
* rectangular flotation results in adequate performance in protected waters; optional cylindrical element increases wave response capability particularly where short-period waves or chop occur
* outstanding features include comprehensive but simple design, practical connectors, and quality of construction; the boom should be considered a low-cost alternative to standard, inshore models

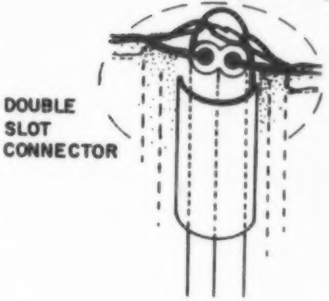
ADDITIONAL INFORMATION (prototype only)

Solsberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

FLEXY II OIL BOOM (Hurum Engineering Ltd.)

price upon request





PHYSICAL SPECIFICATIONS

Dimensions	14" (35.6 cm)	18" (45.7 cm)	24" (61 cm)	36" (91.4 cm)
overall height	35.6 cm	45.7 cm	60.9 cm	91.4 cm
freeboard	12.1 cm	15.2 cm	20.3 cm	30.5 cm
draught	23.5 cm	30.5 cm	40.6 cm	61.0 cm
section length	15.2 m	15.2 m	15.2 m	15.2 m
shipping volume	0.4 m^3	0.5 m^3	0.8 m^3	1.0 m^3
Weight				
per section	22.6 kg	33.9 kg	58.8 kg	67.9 kg
per unit length	1.5 kg/m	2.2 kg/m	3.9 kg/m	4.5 kg/m

Fabric (all models) -	yellow, PVC-coated nylon, optional polyurethane coating
tensile strength	204/181 kg
tear strength	50/45 kg
cold crack temperature	-55°C
weight	610 g/m^2

Flotation (parantheses denote deflection model) - double cylindrical Ethafoam cores sealed in boom fabric

diameter	5.1 cm	5.1 (10.2) cm	7.6 cm	7.6 cm
buoyancy: weight ratio	2.6:1	1.7:1 (4.2:1)	2.3:1	2.0:1

Connector - extruded aluminum, double round slots, handle, flotation

Lower Tension and Upper Tension Members - steel cables in all models

size	31 mm	31 mm	64 mm	64 mm
breaking strength	907 kg	907 kg	3176 kg	3176 kg

Ballast - lead weights, weight unspecified

Vertical Stiffeners - 6.35 mm aluminum every metre capped by plastic fitting

Handholds - none

Anchor Points - at section ends

Other Data - 72" (1.8 m) model available; also 18" (46 cm), 20" (51 cm), 24" (61 cm) and 36" (91 cm) Flexy B3 Skirt Boom produced with single cylindrical flotation element

OPERATIONAL DATA

Application

* 14" (35.6 cm), 18" (45.7 cm) - inshore and protected waters to sea state 1; 24" (61 cm) to sea state 1-2; 36" (91.4 cm) - more exposed locations to sea state 2
* consider all booms for both stationary containment and angled deflection of oil for work periods of several days to several weeks

Oil Containment

* double cylindrical floats plus tension members top and bottom render booms highly stable; excellent resistance to submerging, planing and skirt deflection
* cylindrical elements result in excellent wave conformance
* freeboard and draught are of adequate size to prevent splashover and drainage
* 18" model (45.7 cm) (10.2 cm flotation) ideal for angled deflection in rivers

Strength & Durability

* double-ply fabric resists weathering, puncture, abrasion and tearing
* sealed junctures do not disengage when stressed
* cable and chain add significantly to overall strength qualities
* aluminum stiffeners are retained by plastic caps to prevent piercing of fabric
* double fabric pocket houses tension chain with nylon band reinforcement
* Ethafoam flotation is flexible and withstands impact from debris

Connection System

* double-slotted connector slides easily over thickened section ends
* tension members must be shackled separately; in-water connection is possible
* connectors include handle and flotation to protect against loss
* disengagement of connectors is unlikely in currents or sea state 0-4

Ease of Use

* compactibility of booms minimizes storage and transportation needs
* light weight facilitates handling; flotation protrudes but is continuous, round unit so that launching, retrieval are snag-free
* fabric is easily maintained, cleaned and repaired
* several reuses of the boom are possible

Design Features

* optional construction detail includes nylon webbing to reinforce double chain pocket; urethane-coated fabric; and larger flotation elements
* Deflector Boom should be specified with larger floats if use in river is anticipated; model 18" (46 cm) with 10.2 cm flotation is excellent choice
* plastic retainer caps at top of stiffeners incorporate hook which allows boom to be suspended from line on storage rack (not durable enough for mooring)
* new Flexy B3 booms include central flotation core and retain double tension members which stabilize deflection operations

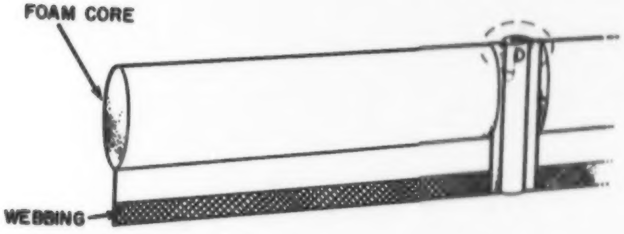
ADDITIONAL INFORMATION

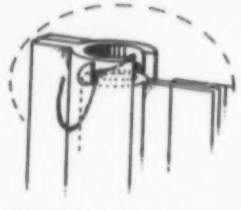
1. Vanderkooy, N., A. Robertson and C.J. Beckett, Evaluation of Oil Spill Barriers and Deployment Techniques for the St. Clair-Detroit River System, EPS-4-EC-76-4, Environment Canada, Ottawa, Ontario (March, 1976).

2. PROSCARAC Oil Spill Containment Boom Evaluation Trials North Saskatchewan River, Canadian Petroleum Association (August, 1980).

Intertrade Industries Ltd.
15301 Transistor Lane
Huntington Beach, CA, 92649, USA
telephone (714)894-5566

OIL SPILL GUARDIAN IW 13, 1H24 & OH36 — price upon request
IW = Inland Waterways
IH = Inner Harbours
OH = Outer Harbours





PHYSICAL SPECIFICATIONS

Dimensions	IW 13	IH 24	OH 36
overall height	33 cm	61 cm	91 cm
freeboard/flotation	13 cm	20 cm	30 cm
draught	20 cm	41 cm	61 cm
section length	15.2 m	15.2 m	15.2 m
storage volume	unspecified		
Weight			
per section	45 kg	62 kg	75 kg
per unit length	2.96 kg/m	4.08 kg/m	4.93 kg/m

Fabric (all models)	International Orange, PVC-coated nylon
tensile strength	90 kg/cm
tear strength	45 kg/cm
cold crack temperature	-40°C
weight	unspecified

Flotation - continuous cylindrical foam core
buoyancy: weight ratio — unspecified

Connector - standard US Navy male/female aluminum coupling

Bottom Tension Member (all models) - polyester webbing in skirt hem
tensile strength — 4535 kg

Other Data - no vertical stiffeners, top tension member; ballast unspecified; handholds have a breaking stength of 136 kg; comprehensive mooring package available separately

OPERATIONAL DATA

Application

* IW13 designed for calm inland water; IH24 and OH36 intended for use in harbours and other semi-protected waters
* IW13 up to sea state 1, IH24 to sea state 1-2, and IH36 to sea state 2
* consider for stationary containment for intermediate work periods of several days to several weeks; deflection of oil in currents of less than 1 knot should also be possible with IH24 and OH36 models

Oil Containment

* continuous cylindrical flotation element should enable booms to resist submerging and should result in excellent wave conformity and stability
* boom's ability to remain fully upright in a current is unknown; the polyester webbing should prevent planing and skirt deflection in currents of 1 knot (1.8 km/h) or less if length is appropriate (there is no ballast chain)
* freeboard and draught are of sufficient size to prevent drainage and splashover in indicated conditions of use; IW13 should be restricted to calm water usage

Strength and Durability

* coated nylon fabric resists weathering, puncture, abrasion and tearing
* polyester webbing is fully encased and increases loading potential of boom
* foam core flotation has good flexibility and should withstand bending and debris
* bonding of flotation to inner bulkhead provides additional durability

Connection System

* US Navy couplings interlock easily; a locking pin secures the connection
* no tools are required for interconnection of sections
* optional bulkhead assembly permits sealed connection to pilings and allows for rise and fall of tide; comprehensive mooring package has been designed for attachment through a bridle to connectors
* tow assembly is also available in the form of a well-designed paravane
* adaptors are available for compatibility with other booms
* try in-water connection of IW13; preconnect IH24 and OH36 on land

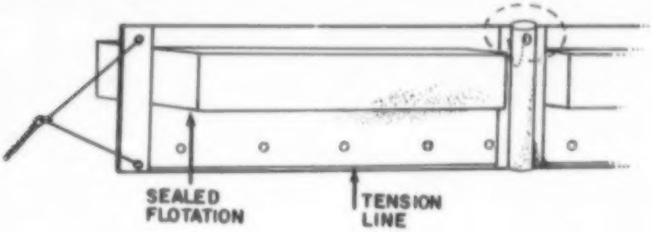
Design Features

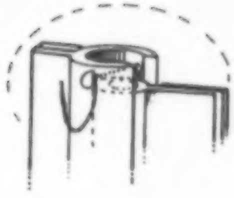
* shape and size of flotation element coupled with bottom tension webbing should render booms highly suitable for their intended function
* ancillary components have been well designed; these include repair kit, bulkhead assembly, shipping/storage container, tow assembly, adaptors and mooring system
* choice of fabric, lack of ballast chain and connector type are positive features; non-inclusion of upper tension member, i.e., above flotation, may preclude use of boom in higher currents (greater than 1 knot (1.8 km/h))

OS44 AND P36 OS = Open Seas
P = Permanent
(Intertrade Industries Ltd.)

price upon request

PERMANENT BOOM





U.S. NAVY CONNECTOR

PHYSICAL SPECIFICATIONS

	OS44	P36
Dimensions		
overall height	112 cm	91 cm
freeboard/flotation	51 cm	30 cm
draught	61 cm	61 cm
section length	15.2 m	15.2 m
storage volume	unspecified	
Weight		
per section	136 kg	125 kg
per unit length	8.95 kg/m	8.22 kg/m
Fabric (both models) - International Orange, PVC-coated nylon		
tensile strength	243 kg/cm	180 kg/cm
tear strength	71 kg/cm	61 kg/cm
cold crack temperature	-40°C	-40°C
weight	unspecified	
Flotation -	foam cylinder	external cylindrical floats closed-cell polyethylene foam
diameter	51 cm	
buoyancy: weight ratio	unspecified	unspecified
Bottom Tension Member (both models) - polyester webbing in skirt hem		
tensile strength	4535 kg	
Ballast -	unspecified	lead weights

Other Data - no vertical stiffeners, to tension member; handholds and anchor points unspecified

OPERATIONAL DATA

Application

* OS44 designed for offshore use; P36 conceived as permanent installation
* OS44 applicable up to sea state 2-3; P36 should function well in sea state 2
* both booms should be considered for stationary containment with OS44 also capable of deflection of oil in currents of less than 1 knot (1.8 km/h) when placed at angle to flow

Oil Containment

* cylindrical flotation of OS44 and outrigger-style floats of P36 should lend stability to booms and allow them to resist submerging
* wave conformance capability of OS44 should exceed that of P36; both booms should respond well for their intended location of use
* drainage and splashover should not occur for indicated usage conditions since freeboard and draught are of adequate size
* planing and skirt deflection of OS44 unlikely when deployed in currents <1 knot (1.8 km/h) if strength webbing is appropriate length to assume loading

Strength and Durability

* coated nylon fabric resists weathering, puncture, abrasion and tearing
* polyester webbing fully enclosed in OS44 to increase boom loading potential
* sealed floats of P36 are highly resistant to impact or compression
* flotation of OS44 is bonded to inner bulkhead to provide additional durability; the foam core has good flexibility and should withstand bending

Connection System

* US Navy couplings interlock easily without tools; locking pin secures them
* optional bulkhead assembly permits sealed connection to pilings and accommodates rise and fall of tide; preconnection on land, dock or vessel is recommended
* comprehensive mooring system attaches to connector through bridle
* adaptors permit compatibility with other booms

Ease of Use

* booms are not designed to be highly compactible; this should not be a factor with the P36 but is a consideration for transporting and storing the OS44
* relatively high weight necessitates mechanical assistance for handling
* smooth sides and enclosed lower strength member should facilitate handling of OS44; outrigger-style flotation of P36 requires more attention but should not be a problem since deployments should be infrequent
* P36 should require little maintenance; both booms should be easy to clean; factory repair of P36 could be needed if floats are damaged (unlikely)

Design Features

* both booms are well conceived for their intended design functions; rugged flotation units of P36 and foam of OS44 are good choices
* ancillary components include repair kit, mooring system and connection aids
* non-inclusion of upper tension member above flotation may preclude use of OS44 in currents greater than 1 knot (1.8 km/h) as skirt deflection could occur

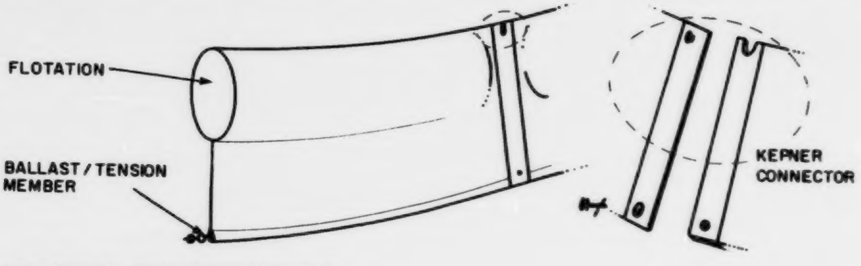
ADDITIONAL INFORMATION

MSE Engineering Systems Ltd. of Downsview, Ontario markets Intertrade booms in Canada (see abbreviated entry for further information).

Kepner Plastics Fabricators Inc.
3131 Lomita Boulevard
Torrance, CA, 90505, USA
telephone (213)325-3162
telex 691646

STANDARD SEACURTAIN, SEA TENDER

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	Standard Bayou-High Seas	Sea Tender Permanent
overall height	25 to 274 cm	88 cm
freeboard	8 to 66 cm	28 cm
draught	17 to 208 cm	60 cm
section length	30.5 to 46 m	15 m and 30 m
shipping volume	0.3 to 21 m^3/46 m	1.4 m^3/30 m
Weight		
per section	39.7 to 920 kg	81 kg and 162 kg
per unit length	1.3 to 20 kg/m	5.4 kg/m

Fabric (all models) - high visibility yellow, Keptex or Kepelastex-coated polyester or nylon foam flotation cover; nylon or polyester netting in fast current models

grab tensile strength	200 to 330 kg
tear strength	73 to 102 kg
cold crack temperature	-51°C
weight	unspecified

Flotation - segmented cylindrical floats encased in boom in Standard models; short, molded cylindrical floats in Sea Tender

dimensions	unspecified	
material type	Resistex copolymer, polyethylene, polypropylene or polyurethane foam	
buoyancy: weight ratio	6.2:1 to 22.5:1	5.6:1

Connector - Quickconnect, hook, slot or hinge-type; aluminum

Ballast/Lower Tension Member - galvanized steel chain in skirt hem; optional stainless steel chain, cables and/or lead weights

Secondary Tension Member - optional polyester webbing/wire rope on both sides below flotation

tensile strength	1000 to 82 000 kg	6800 kg

Other Data - no stiffeners; anchor points, handholds unspecified

OPERATIONAL DATA

Application

- Sea Curtain - harbours, semi-protected waters and offshore applications; Sea Tender - primarily nearshore and harbours; permanent installation possible
- Sea Curtain Booms range from calm water models to larger units applicable to sea state 2-3; Sea Tender Booms are designed for sea states 1 and 2
- both booms primarily for stationary containment from several days to several weeks, depending upon specific materials; some Sea Curtain Booms suitable for deflection of oil in currents up to about 1 knot (1.8 km/h)

Oil Containment

- cylindrical flotation elements enable all booms to resist submerging and result in excellent wave conformity, stability; reserve buoyancy is high
- bottom tension member contributes to booms' ability to maintain a full upright position; secondary tension members optional in Sea Curtain models to lend further stability in higher load situations (currents of 1 knot (1.8 km/h) or less)
- freeboard and draught sized appropriately to reduce splashover and drainage; smallest booms (freeboard = 10 cm) should be restricted to calm water
- planing and skirt deflection are not likely under indicated conditions of use

Strength and Durability

- coated fabrics resist weathering, puncture, abrasion and tearing
- flotation of Sea Tender is durable with hard-skinned molded units; Sea Curtain includes double-walled construction encasing closed-cell foam
- electronically-sealed fabric junctures should preclude disjunction of seams
- load-distribution in tension member(s) should provide substantial overall strength

Connection System

- Quickconnect plates interlock easily and secure with pins; no tools are required
- connectors are preshackled to tension member(s)
- disengagement of connecting plate is unlikely in sea conditions indicated above

Ease of Use

- except for smallest models, booms are not highly compactible
- medium-to-large size models are relatively heavy and mechanical assistance is recommended for deployment and retrieval; Sea Curtain booms store on a reel
- small, individual floats of Sea Tender require attention during handling so that snagging does not occur; floats are durable
- smooth-sides of Sea Curtain should facilitate launching and retrieval; netting in skirt of "fast current" models may snag on protrusions
- all booms are easily cleaned; floats of Sea Tender need additional care

Design Features

- Kepner offers comprehensive ancillary components including storage reels, trailers, deployment aids, anchoring systems, pier connector and bridles
- netting in skirt is optional in "fast current" models of Sea Curtain; its contribution to oil containment is uncertain; multiple tension members should produce stability, particularly the standard bottom chain
- shorter, individual floats of Sea Tender should result in excellent wave conformity in short-period waves

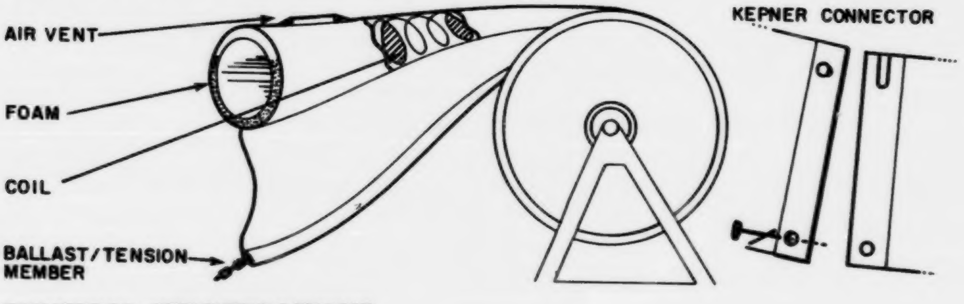
ADDITIONAL INFORMATION

1. The 48" Kepner Sea Curtain (plus 24" bottom net) was tested at OHMSETT November 15-24, 1982. Prelimnary data were not available for publication.

2. Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing, 1974-1979, EPA-600/9-81-007, US Environmental Protection Agency, Cincinnati, OH, (January, 1981).

SEACURTAIN Compactible
Super Compactible
Reel Pak
(Kepner Plastics Fabricators Inc.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	Compactible	Super Compactible	Reel Pak
overall height	51 to 244 cm	51 to 76 cm	51 to 107 cm
freeboard	18 to 53 cm	18 to 30 cm	18 to 42 cm
draught	33 to 191 cm	33 to 46 cm	33 to 65 cm
section length	51 to 61 m	51 m	30.5 to 61 m
shipping volume	0.3 to 4.8 m^3	0.2 to 0.5 m^3	0.3 to 1.7 m^3
Weight			
per section	102 to 1159 m	102 to 255 m	61 to 366 m
per unit length	2 to 19 kg/m	2 to 5 kg/m	2 to 6 kg/m

Fabric (all models) - high visibility yellow, Keptex or Kepelastex-coated polyester liner, flotation cover and skirt; nylon or polyester netting for fast current models

grab tensile strength	200 to 335 kg
tear strength	75 to 100 kg
cold crack temperature	-51°C
weight	unspecified

Flotation - cylindrical; formed by continuous stainless steel coil, fabric and foam discs (sheets in Reel Pak) self-inflating compartments plus polyethylene and/or polyurethane foam

buoyancy: weight ratio	16:1	16:1 to 21:1	16:1 to 28:1

Connector - Quickconnect, hook, slot or hinge-type; aluminum

Ballast/Lower Tension Member - galvanized steel chain in skirt hem; optional stainless steel chain, cables and/or lead weights

Secondary Tension Member - optional polyester webbing and wire rope on both sides below the flotation

tensile strength	9000 to 82 000 kg	9000 to 210 000 kg	11 000 to 33 000 kg

Other Data - no stiffeners; anchor points, handholds unspecified

OPERATIONAL DATA

Application

- various models designed for emergency use in inland waters to offshore application
- applicable to sea states ranging from 1 to 2-3 for largest booms
- all booms primarily for stationary containment for several days to 1 week; deflection of oil in currents up to about 1 knot (1.8 km/h) should also be possible

Oil Containment

- cylindrical air chambers supplemented by foam should enable booms to conform well to waves and prevent submerging; reserve buoyancy is very high
- bottom tension chain plus optional webbing and wire rope contribute to overall stability and ability to maintain a full upright position in low currents
- freeboard and draught are adequately sized to prevent splashover and drainage
- planing, skirt deflection unlikely because of air chamber and tension member(s)

Strength and Durability

- coated polyester fabric resists weathering, puncture, abrasion and tearing
- steel coil and foam reinforcement in double-walled construction helps flota-tion retain its shape for prolonged periods of immersion and withstand debris
- fabric junctures are electronically sealed to minimize the possibility of disjunction
- even load distribution in tension member(s) should provide sustantial strength

Connection System

- Quick connect plates interlock easily; no tools are required
- locking pin secures connections
- connectors are preshackled to tension member(s)
- disengagement of connecting plates is unlikely in sea conditions indicated

Ease of Use

- all booms are highly compactible and can be stored on a reel
- smaller models are light-weight; larger models, particularly the Compactible series, are heavy enough to require mechanical assistance for retrieval
- all booms are smooth-sided and self-inflating so that snagging when launching should not be a problem; exercise care to avoid tearing air chamber on sharp protrusions
- all booms should be easy to clean and maintain; repair kits are available

Design Features

- ancillary components include storage reels, deployment aids, anchoring systems, bridles and pier connectors
- inner stainless steel coil extends the length of the boom; it plus foam lends shape to the boom to result in "self-inflating" capability without valves
- bottom tension member is sealed into hem of skirt
- foam discs compartmentalize the Compactible series booms

ADDITIONAL INFORMATION

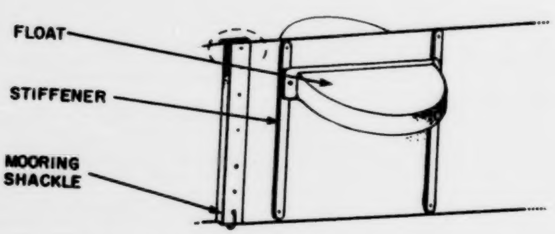
No test data on Compactible (including reel model) Kepner Booms were located. Consult previous entry for evaluation data on other Kepner barriers.

Mannesmann Italiana SpA
Anti-pollution Department
Via G. D'Annunzio, 2-104
16121 Genova, Italy
telephone (39)(10)581.043
telex 270042 a/b PUDEL GE

R2

price (FOB Genoa, $US/m effective
30-6-82 $1 US = 1400 lira)

$85



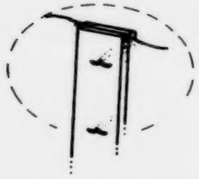


PLATE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	
overall height	80 cm
freeboard	30 cm
draught	50 cm
section length	20 m
storage volume	0.70 m^3
Weight	
per section	50 kg
per unit length	2.5 kg/m
Fabric	black, nylon-reinforced neoprene
tensile strength	50 kg/cm
tear strength	15 kg
cold crack temperature	-20°C
weight	2800 g/m^2

Flotation - 36 flat, semi-circular molded plastic floats, foam-filled

buoyancy: weight ratio	unspecified
Connector -	bolted plates and wing nuts, stainless steel
Ballast -	lead weights weighing 0.30 kg/m
Tension Members -	none
Vertical Stiffeners (spacing) -	1.34 m
Anchor Points -	two mooring shackles per 20-m section
Handholds -	none

OPERATIONAL DATA

Application

* harbours, semi-protected bodies of water and general use in nearshore waters
* applicable in up to sea state 2
* consider for stationary containment of oil for short-term (several days) to long-term (several weeks or more)

Oil Containment

* outrigger-style flotation renders boom highly stable so that wave conformity should be good and resistance to submerging should be high
* planing, skirt deflection may occur in currents of about 0.75 knot (1.4 km/h) or more since there are no tension members
* freeboard and draught are of adequate size to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* boom fabric of nylon-reinforced neoprene is very high weight and should resist weathering and abrasion; relatively low tear strength could mean susceptibility to puncture and tearing if sharp protrusions are contacted
* comprehensive attention to detail includes attachment of each flotation unit through backing plate to twin set of vertical stiffeners
* floats are foam-filled rigid plastic which should withstand impact from debris

Connection System

* bolted plates interlock via wing nuts; these may loosen in short breaking waves unless extra precautions are taken, e.g., wiring these closed
* on-land preconnection is recommended; once deployed the boom's light weight allows section ends to be lifted from water for interconnection from small vessels
* connectors are securely fastened to boom fabric so that even load distribution should result over entire boom height

Ease of use

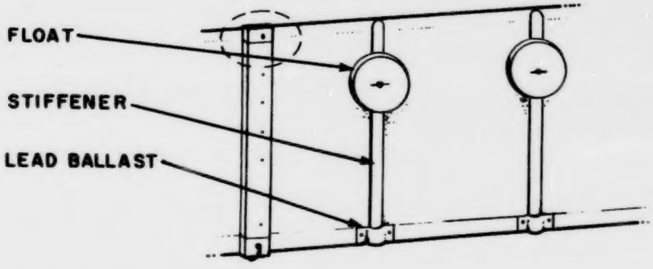
* boom is not compactible, preplan transportation/storage needs
* boom's relatively light weight allows easy handling
* outrigger flotation protrudes significantly; attention should be paid during deployment and retrieval so that snagging does not occur
* cleaning and maintenance should be readily accomplished; repairs to fabric tears should be easily carried out should they be necessary

Design Features

* stiffeners, floats and connectors appear to be firmly fastened to boom proper
* reserve buoyancy is likely high and should result in good boom performance
* reinforcement at section ends includes double layer of fabric at connector plate, grommets, and nylon rope which should all contribute to low probability of boom sections separating if wing nuts back off
* design details include mooring shackles in connecting plates, twin sets of rigid plastic stiffeners and securely-fastened floats; long-term use is foreseen if boom fabric is not damaged

R11
(Mannesmann Italiana SpA)

price (FOB Genoa, $US/m effective
30-6-82 $1 US = 1400 lira)
$70



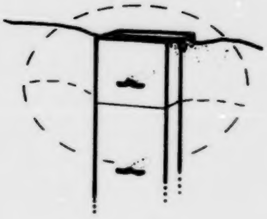


PLATE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions

overall height	80 cm
freeboard	30 cm
draught	50 cm
section length	20 m
storage volume	0.15 m^3

Weight

per section	56 kg
per unit length	2.8 kg/m

Fabric - black, nylon-reinforced neoprene

tensile strength	50 kg/cm
cold crack temperature	-20°C
weight	2800 g/m^3

Flotation - 60 foam-filled, cylindrical rigid plastic floats per section

buoyancy: weight ratio	unspecified

Connector -	bolted plates and wing nuts, stainless steel

Ballast - lead weights at lower end of vertical stiffeners weighing 0.30 kg/m

Tension Members -	none
Vertical Stiffeners (spacing) -	0.33 m
Anchor Points -	two mooring shackles per 20 m section
Handholds -	none

OPERATIONAL DATA

Application

- harbours, semi-protected bodies of water, and other general nearshore use
- applicable in up to sea state 1-2
- consider for stationary containment of oil for extended periods (several weeks or more); suitable for emergency use as well as long-term applications

Oil Containment

- boom should retain full upright position and has sufficient freeboard and draught to prevent washover and drainage for sea conditions indicated
- wave conformity may deteriorate in breaking waves, higher sea states (f2)
- planing and skirt deflection may occur in currents 1/2 to 1 knot (0.9 to 1.8 km/h) and greater since there are no tension members

Strength and Durability

- nylon-reinforced neoprene fabric is very high weight and should resist weathering and abrasion; relatively low tear strength means boom may be susceptible to puncture and tearing if snagging occurs
- vertical stiffeners add to durability of boom by providing a means of attachment for flotation and lead ballast
- floats are foam-filled, rigid plastic and should withstand impact from debris

Connection System

- bolted plates/wing nuts may loosen upon prolonged exposure to breaking waves
- on-land preconnection is preferred although boom's light weight allows section ends to be lifted from water for on-vessel interconnection
- connectors are securely fastened to boom fabric so that even load distribution should result over entire boom height

Ease of use

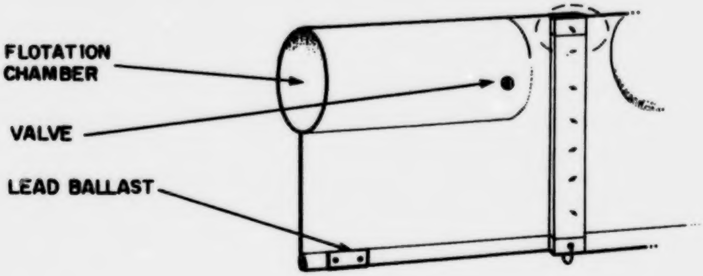
- boom is highly compactible for transportation and storage
- its relatively light weight allows easy handling
- floats protrude slightly although their small size should prevent snagging
- both cleaning and maintenance should be readily accomplished; repairs to fabric tears should also be easily carried out should these occur

Design Features

- lead ballast, stiffeners, floats and connectors appear to be firmly attached to boom
- although not specified, reserve buoyancy is not likely high vis-a-vis other booms due to small size of flotation units
- rigid plastic vertical stiffeners, mooring shackles and extensive use of rivets comprise comprehensive attention to detail that should allow long-term use
- reinforcement at section ends includes fabric over terminal plate, grommets and nylon rope; boom separation should not occur unless wing nuts loosen

PNA
(Mannesmann Italiana SpA)

price (FOB Genoa, $US/m effective
3-6-82 $1 US = 1400 lira)
$80



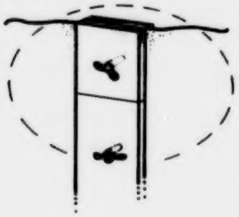


PLATE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions

overall height	80 cm
freeboard	30 cm
draught	50 cm
section length	10 m
storage volume	0.30 m^3

Weight

per section	28 kg
per unit length	2.8 kg/m

Fabric - black, nylon-reinforced neoprene

tensile strength	50 kg/cm
tear strength	15 kg
cold crack temperature	-20°C
weight	2300 g/m^2

Flotation - inflatable cylindrical chamber 30 cm in diameter, approximately 9.7 m long

Connector - bolted plates and wing nuts, stainless steel

Ballast - lead weights weighing 0.30 kg/m riveted to skirt hem

Tension Members - none

Vertical Stiffeners - connector plates serve as stiffeners

Anchor Points - mooring shackle at bottom end of each connector set

Handholds - none

OPERATIONAL DATA

Application

* harbours, semi-protected bodies of water, general nearshore emergency use
* applicable in up to sea state 2
* consider for stationary usage for short-to-medium periods (several days to one week)

Oil Containment

* cylindrical air chambers should result in excellent wave conformity, stability, and resistance to submerging
* skirt deflection and planing may occur in currents 1/2 to 1 knot (0.9 to 1.8 km/h) and greater
* freeboard and draught are of appropriate size to prevent splashover and drainage in a stationary containment mode in up to sea state 2

Strength and Durability

* nylon-reinforced neoprene fabric is very high weight and should resist weathering and abrasion; its relatively low tear strength means boom may be susceptible to puncture and tearing if sharp protrusions are contacted
* upper section of boom and skirt hem is double layer of fabric; the upper fabric layers form the air chamber so that a single-walled flotation unit results
* should puncture occur, all buoyancy would be lost for the section of boom affected
* the boom has no tension members but the highweight fabric should be adequate to sustain loading particularly for stationary or low current deployment

Connection System

* bolted plates fasten via wing nuts which may back off upon prolonged exposure to short breaking waves unless wire closed
* on-land preconnection is recommended; once inflated and deployed the boom's light weight permits section ends to be lifted onto small vessels for interconnection
* connectors are securely attached to boom fabric so that even load distribution should result over entire boom height

Ease of Use

* boom is highly compactible for both transportation and storage purposes
* an air compressor must be used to inflate each 10 m section
* the boom's light weight allows easy handling
* smooth sides reduce chance of snagging; care should be taken, however, to prevent puncture or tearing on sharp objects
* repairs to the fabric, maintenance and cleaning should be readily accomplished

Design Features

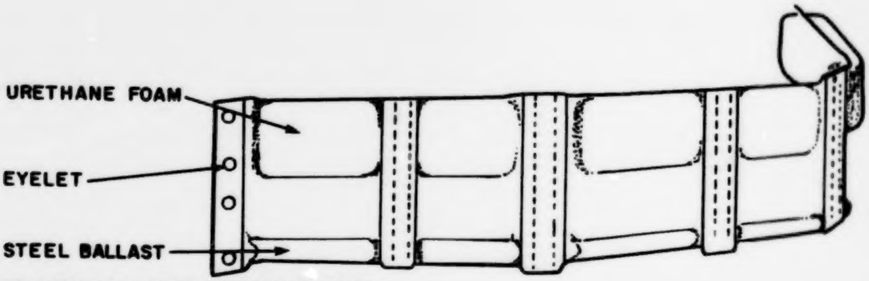
* lead ballast and connectors are firmly attached to boom by rivets and grommets
* reserve buoyancy is likely the highest of all Mannesmann booms; this plus the flexible neoprene-base fabric should result in excellent wave conformity
* a single valve permits both inflation and deflation
* double fabric at skirt hem, towards section ends, and at connectors are appropriate locations for reinforcement
* mooring shackles at bottom of connecting plates are also of practical design

Megator Corporation
562 Alpha Drive
Pittsburgh, PA, 15238, USA
telephone (412)963-9200
telex 81-2573

MEGATOR MINI-BOOM

price (point of manufacture
$US/section effective 9-1-82)

$300



PHYSICAL SPECIFICATIONS

Dimensions	
overall height	22.9 cm
freeboard	5.8 cm
draught	17.1 cm
section length	5.03 m
shipping volume	0.25 m^3
Weight	
per section	4.8 kg
per unit length	0.96 kg/m
Fabric - yellow, PVC-coated nylon	
grab tensile and tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified
Flotation - 11.6 cm square urethane foam	
buoyancy: weight ratio	unspecified
special features	enclosed within boom fabric
Connector - nylon eyelets (and rope); these also serve as mooring points	
Ballast -	mild steel weights
dimensions	unspecified
weight	unspecified
Tension Members -	none
Vertical Stiffeners -	none
Anchor Points (spacing) -	5.03 m

OPERATIONAL DATA

Application

- sheltered, shallow water including sumps, ditches and inner harbours
- applicable in up to sea state 1
- consider for short-term use (less than one day) where minor amounts of oil have been spilled or larger volumes of oil have already been concentrated

Oil Containment

- flotation allows boom to be stable and resist submerging in calm water
- small overall height precludes use in waves; expect drainage and splashover (freeboard is only 5.8 cm) in small, short-breaking waves
- entrainment is likely in low currents (1/2 knot (0.9 km/h)); otherwise, planing and skirt deflection could also result in oil losses in currents since there are no tension members

Strength and Durability

- coated nylon cloth should resist weathering and provide adequate anti-tear, -puncture, and -abrasion qualities
- closed-cell foam flotation is fully enclosed and should withstand debris infestations
- all fabric junctures are heat-sealed and should not be prone to disengagement
- boom's sealed-in steel weights and construction detail suggest few reuses

Connection System

- simple ropes easily interconnect sections through nylon eyelets; no tools are required
- connections should have sufficient strength for indicated conditions of use
- in-water or on-land interconnection is possible
- wear of fabric at eyelet may result if the boom is subjected to currents

Ease of Use

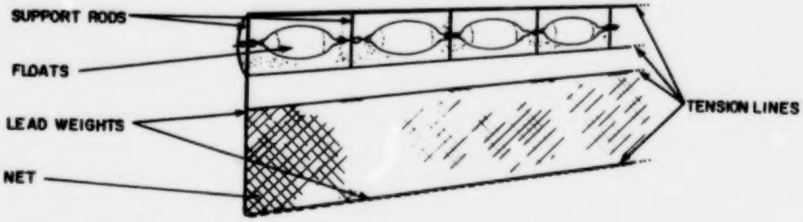
- boom is highly compactible and folds well for either storage or transportation
- the light weight and smooth sides allow easy handling, quick deployment, and retrieval
- several reuses of the boom should be possible if it is handled with care
- repairs to the fabric, maintenance and cleaning should be readily accomplished

Design Features

- the flotation and ballast are adequately protected within the boom structure
- the thermally-sealed fabric, choice of materials, overall design, and simple connection system are appropriate for an inner-harbour boom
- the freeboard is very small and places significant limitations on the conditions of use, i.e., the boom can only be used in calm water
- one person can easily handle several sections of boom for quick usage

NOFI A/S
Damsgardvei 7779
5001 Bergen, Norway
for contact information see
Bennex A/S under Abbreviated Entries

NOFI Oil Containment Boom System price upon request



PHYSICAL SPECIFICATIONS

Dimensions	HL-30	KL-8	X-F7	X-F11	XL-F11
overall height	100 cm	335 cm	300 cm	400 cm	600 cm
freeboard	30 cm	100 cm	80 cm	102 cm	102 cm
draught	70 cm	225 cm	220 cm	298 cm	498 cm
section length (fixed buoys, serial filled)	50* m	100* m	250 m	250 m	250 m
section length	(*see also Flotation)				
(removable buoys, each air filled)	--	200 m	500 m	500 m	500 m
shipping volume	--	5.2 m^3	14.0 m^3	18.0 m^3	19.0 m^3

Weight	HL-30	KL-8	X-F7	X-F11	XL-F11
per section	300 kg	1300/2600 kg	5250/10 500 kg	7500/15 000 kg	8750/17 500 kg
per unit length	6 kg/m	13 kg/m	21 kg/m	30 kg/m	35 kg/m

Fabric (all models) - International Orange, PVC

grab tensile strength	unspecified
cold crack temperature	unspecified
tear strength	unspecified
weight	unspecified

Flotation - ellipsoidal PVC floats - all models; solid for HL-30, individually air-filled for KL-8; optional serial or individual air filling for other models; floats detachable in individual filling models only

Ballast - lead weights below centre and bottom tension lines, weight and spacing unspecified

Lower Tension Member - Kevlar in all models

breaking strength	3000 kg	20 000 kg	60 000 kg	60 000 kg	60 000 kg

Other Tension Members - Kevlar lines top, centre and above net

Vertical Stiffeners - support rods between floats

Anchor Points, Handholds - unspecified

OPERATIONAL DATA

Application

- HL-30 for harbours and semi-protected waters; other models - offshore use
- HL-30 applicable up to sea state 2; other booms up to sea state 2-3
- booms intended for both stationary deployment and sweeping modes oil concentration/deflection should be possible at relative velocities of about 1 knot (1.8 km/h)

Oil Containment

- multiple tension members coupled with individual floats oriented horizontally should render all models highly stable
- all booms should have excellent resistance to submerging, planing and skirt deflection
- type and configuration of floats should result in very good wave conformance
- freeboard and draught are adequate to prevent drainage and splashover under indicated conditions of use

Strength and Durability

- PVC fabric should resist weathering, puncture, tearing and abrasion
- Kevlar tension lines are high strength and should bear any load acting on the boom under the indicated conditions of use
- PVC floats (solid in HL-30) supported by metal rods should endure offshore deployment at sea states beyond which oil containment is possible
- boom has been designed to respond to higher sea states without incurring damage

Connection System

- models with X-F designation are available as single lengths of 250 or 500 metres so that interconnection of sections is not normally necessary
- connectors are not specified for HL and KL models although the 200 metre KL boom should suffice as a useful, single unit of appropriate length

Ease of Use

- an air compressor is necessary for both fixed floats, which require serial (in-line) filling, and individual floats, which each must be air-filled
- a large self-contained winch with storage drum is recommended to facilitate both storage and deployment; other launching modes are not as practical
- size of boom, deployment equipment require vessels with substantial deck space
- care must be taken to ensure that floats and associated supports do not snag
- the flotation system requires individual unit inflation
- models with netting in skirt and permanent floats are not easily cleaned

Design Features

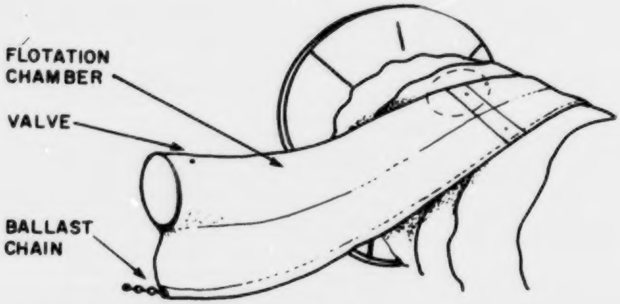
- location and type of strength members are appropriate for offshore booms
- the durable floats are highly suitable for a range of sea conditions
- larger models with overall heights of up to 6 metres will survive rough seas but will likely offer oil containment potential similar to smaller booms
- the attachment of all components including lead weights, netting, strength members and floats has been designed for survival in offshore ocean conditions
- reel deployment of the booms should be planned because of size and weight

Nordan International A/S
P.O. Box 55
3470 Slemmestad, Norway
telephone (47)(02)78 03 60
telex 72447 a/b NORIN

NORDAN BOOMS Harbour, Sea & Ocean

price (point of manufacture
$US/m effective 1983)

Harbour Boom	$110
Sea Boom	$190
Ocean Boom	$320



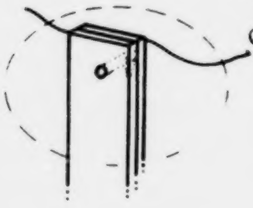


PLATE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	Harbour	Sea	Ocean
overall height	60 cm	86 cm	150 cm
freeboard	25 cm	35 cm	60 cm
draught	35 cm	51 cm	90 cm
section length	10 m	10 m	8 m
shipping volume	unspecified		
Weight			
per section	40 kg	90 kg	125 kg
per unit length	4 kg/m	9 kg/m	15 kg/m

Fabric (all models) - black, polyester cord-reinforced neoprene rubber

grab tensile strength	unspecified		
tear stength	unspecified		
cold crack temperature	-40°C		
weight	900 g/m^2	700 g/m^2	unspecified

Flotation (all models) - cylindrical, air-inflated chambers

diameter	25 cm	35 cm	60 cm
buoyancy: weight ratio	12:1	10:1	18:1
special features	individual chambers are filled by compressor or blower; fabric is sealed by heat vulcanization		

Connector - end plates bolt together; aluminum in Harbour and Sea Booms and galvanized steel in Ocean Boom

Ballast (chain in all models)

size	10 mm	10 mm	15 mm
weight	2.0 kg/m	2.0 kg/m	2.6 kg/m

Other Data - Nordan markets winders, winches, containers, air blowers and a skimmer compatible with their booms

OPERATIONAL DATA

Application

- Harbour model suitable for protected bodies of water and inshore use; Sea Boom appropriate for semi-protected waters including harbours and nearshore; Ocean Boom Size for Offshore applications
- Harbour Boom applicable in up to sea state 1-2; sea model in up to sea state 2-3
- consider all booms primarily for stationary containment; oil deflection in currents of less than 1 knot (1.8 km/h) should also be possible

Oil Containment

- cylindrical air chamber in combination with bottom tension member should render boom highly stable; all models should exhibit excellent resistance to submerging, planing and skirt deflection
- continuously flexing, cylindrical flotation should result in excellent wave conformity
- freeboard and draught are adequately sized to prevent splashover and drainage under indicated conditions of use; note the Harbour Boom should be restricted to protected waters

Strength and Durability

- polyester-reinforced neoprene resists puncture, tearing, abrasion and weathering
- sealed fabric junctures are vulcanized and should not disengage in high sea states
- ballast chain adds to overall strength if of appropriate length

Connection System

- aluminum or steel plates bolt together; simple hand tools are required
- sections should be preconnected and, for offshore applications, stored on a reel
- connectors are appropriate for medium-to-long-term use

Ease of Use

- each section requires individual inflation by an air compressor
- booms are highly compactible and can be stored on a reel
- all models are relatively heavy so that mechanical assistance must be considered for deployment and retrieval
- smooth sides should permit snag-free use although precautions should be taken to avoid sharp projections in spite of good material strength
- booms are easily cleaned, require no maintenance and field repairs should be possible

Design Features

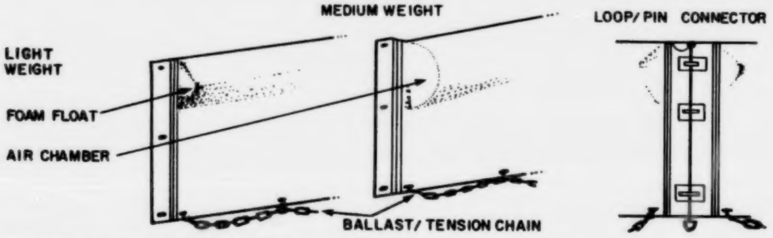
- all models have high reserve buoyancy
- the multiple-layer fabric should not be prone to delamination because of the vulcanization process used to seal it
- a single air valve is incorporated into each section
- the ballast/tension chain is fully enclosed within the boom fabric
- tensile strength of fabric is very high

NORGAS AS
Postboks 4234 Torshov
Oslo, 4, Norway
telephone (47)(02)38 99 50
telex 16 209 a/b GAS N

SKUTENG OIL BOOM

price quoted (point of manufacture
$US/section effective 1-1-83)

WSA Light Weight $1140
Medium Weight (with reel) $11 070



PHYSICAL SPECIFICATIONS

Dimensions	Light Weight	Medium Weight
overall height	60 cm	90 cm
freeboard	20 cm	40 cm
draught	40 cm	50 cm
section length	25 m	50 m
shipping volume	0.7 m^3	1 m^3
Weight		
per section	65 kg	300 kg
per unit length	2.6 kg/m	6 kg/m
Fabric (both models) - orange		
type	PVC	polyester
tensile strength	65 kg/cm	170 kg/cm
tear strength	unspecified	32 kg/cm
cold crack temperature	-30°C	-40°C
weight	unspecified	1290 kg
Flotation (both models) - cylindrical flotation segments		
diameter x length	20 x 100 cm	40 x 100 cm
material type	polystyrene foam	air -inflated
buoyancy: weight ratio	unspecified	unspecified

Connector - loops and locking pin, stainless steel (both models)

Ballast/Lower Tension Member - galvanized steel chain in skirt hem in both models; Light Weight breaking strength = 10 000 kg, weight = 2 kg/m; unspecified for Medium Weight

Top Tension Member -	none	none
Vertical Stiffeners -	none	none
Anchor Points (spacing) -	25 m (or along chain)	50 m (or along chain)
Handholds (spacing) -	25 m	50 m

OPERATIONAL DATA

Application

* Light Weight (LW) - protected waters and inshore use; Medium Weight (MW) -semi-protected waters such as harbours and general nearshore applications
* LW model applicable up to sea state 1-2; MW boom in up to sea state 2
* consider both booms primarily for stationary containment; for short-to-medium term (several days to one week) oil deflection in currents of less than 1 knot (1.8 km/h) should also be possible

Oil Containment

* cylindrical flotation plus bottom tension/ballast chain should render booms highly stable; resistance to submerging, planing and skirt deflection should be excellent
* MW should conform to waves better than LW, but both should be very good
* freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

* both boom fabrics should resist weathering, puncture, tearing and abrasion
* the polyester fabric is high weight and should exhibit superior strength qualities
* flotation of LW boom resists debris and is better suited for inner harbours
* bottom chains in both booms are very high strength and should add significantly to overall durability if tensioned to accept load

Connection System

* loop-and-pin connector is easy to use; tension chain must be secured separately
* preconnection on land or vessel is suggested, particularly for larger MW model
* locking pin secures connection; reinforced loops protect against damage
* prolonged exposure to high sea states may lead to disengagment of sections

Ease of Use

* both booms are of medium compactibility for their size; storage and transportation of multiple section lengths should be preplanned
* air compressor is needed for inflating MW boom
* LW model has low weight and is easy to handle; MW is heavier and requires mechanical assistance for deployment and retrieval
* both booms have smooth sides; however, external ballast chain may snag
* booms are easily repaired, maintained and cleaned

Design Features

* all fabric seams "high-frequency welded"
* multiple anchoring points are reinforced; chain can also be used for mooring
* MW boom incorporates aluminum reinforcement in air chamber
* reserve buoyancy should be relatively high, particularly for MW model

ADDITIONAL INFORMATION

1. Langfeldt, J.N. and M. Wold, Full Scale Tests with Oil Recovery Systems Offshore Norway, June 1980, Oil Pollution Control Research and Development Program, Oslo, Norway (June, 1981).

2. See also Abbreviated Entries under Skuteng A/S.

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370, avenue Napoleon-Bonaparte
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telephone (33)(1)732.10.86
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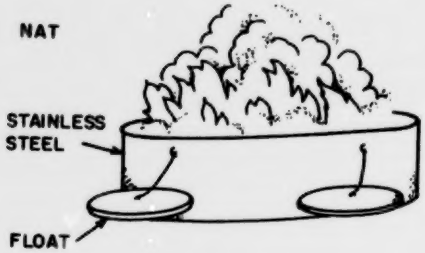
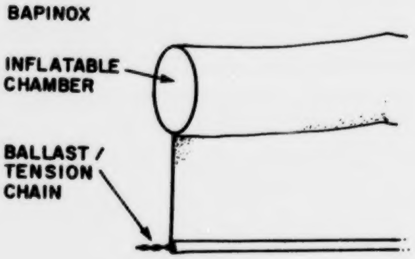
NAT, BAPINOX BOOMS

price (point of manufacture
$US/m effective 13-12-82)

NAT $21
BAPINOX $300





PHYSICAL SPECIFICATIONS

Dimensions	BAPINOX	NAT
overall height	100 cm	80 cm
freeboard	40 cm	30 cm
draught	60 cm	50 cm
section length	12 m	100 m
shipping volume	2.94 m^3 (96 m boom)	--
Weight		
per section	126.4 kg	2200 kg
per unit length	10.5 kg/m	2.2 kg/m
Fabric -	stainless steel	polyethylene
Flotation -	stainless steel external floats	inflatable chambers
no. of units	8 pairs/section	1/2.5 m
diameter x length	40 x 16 cm	30 x 1000 cm
buoyancy: weight ratio	unspecified	unspecified
Connector -	1 m stainless steel removable coupling weighing 3.3 kg	unspecified
Tension Member -	none	chain (unspecified) along bottom edge

Other Data - Bapinox designed as fireproof boom, NAT as a disposable product; information on handholds, anchor points, stiffeners unspecified

OPERATIONAL DATA

Application

* NAT designed for protected bodies of water including nearshore applications; Bapinox is a fireproof boom suitable for sheltered and semi-exposed locations
* NAT applicable in up to sea state 2; Bapinox should function in sea state 1-2
* consider NAT as disposable product designed for short-term use; Bapinox will also concentrate oil for in situ burning for shorter periods; both booms are intended for stationary containment; NAT should deflect oil in currents less than 1 knot (1.8 km/h)

Oil Containment

* NAT has inflatable chambers and lower tension chain which should render boom stable and result in good resistance to submerging, planing and skirt deflection
* steel construction plus external floats should allow Bapinox to assume full upright position without submerging
* NAT's flotation should result in excellent wave conformity; Bapinox should also ride smaller wave forms well (less than 0.5 m wave heights)
* freeboard and draught are sized appropriately in both booms to prevent splashover and drainage

Strength and Durability

* NAT fabric does not resist wear, weathering; it is suitable for disposable boom
* stainless steel of Bapinox should withstand the combustion of crude oil; stress fractures may ocur upon prolonged exposure to short breaking waves
* bottom tension chain of NAT should add considerably to boom's strength
* inflatable chambers of NAT may puncture unless extra care is taken

Connection System

* Bapinox coupling can be easily connected; preconnection on land is required
* NAT available in lengths of 100 m or more so that connectors are not necessary
* Bapinox connectors are electro-chemically compatible with material of boom

Ease of Use

* NAT is compactible so that it can be readily stored and transported
* NAT is lightweight for easy handling, deployment, and retrieval
* NAT requires an air compressor for inflation; disposal upon recovery is possible
* Bapinox is relatively heavy and requires mechanical assistance for handling, launching and retrieval; attachment of floats is necessary
* preplanning required length of Bapinox should be undertaken; also select area of assembly, method of launching, and mode of transportation to spill site

Design Features

* NAT's main advantages are its one-piece design and opportunity of disposal after use
* Bapinox design detail includes detachable floats and easy-to-use couplers
* NAT has relatively high reserve buoyancy
* Bapinox's overall height is appropriate fo a fireproof boom

ADDITIONAL INFORMATION

Buist, I.A., W.M. Pistruzak, S.G. Potter, N. Vanderkooy and I.R. McAllister, The Development and Testing of a Fireproof Boom, proceedings of the 1983 Oil Spill Conference, San Antonio, Texas (February 28-March 3, 1983).

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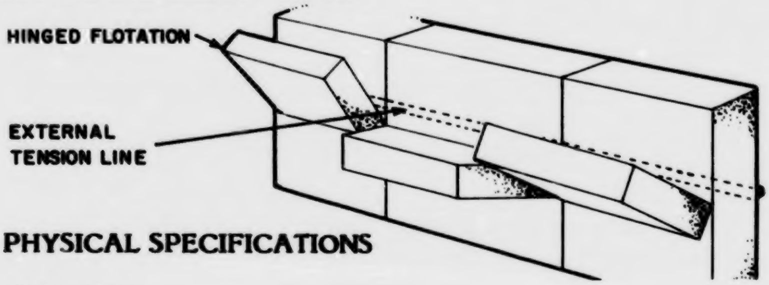
telex 4991299 a/b OFFSHORE

HARBOR BARRIER SCOOP price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	61 cm
freeboard	27 cm
draught	34 cm
section length	15 m
shipping volume	0.6 m^3

Weight

per section	90 kg
per unit length	6 kg/m

Fabric - International Orange, elastomer-coated nylon

tensile strength	53 kg/cm
tear strength	45 kg
cold crack temperature	-40°C
weight	680 g/m^2

Flotation - rectangular 5 x 53 x 91 cm in 2 pieces, Ethafoam

buoyancy: weight ratio	3.83:1
special features	lower flotation piece hinged so that it moves up for deployment, down for storage

Connector -	slotted bar

Ballast - galvanized steel 32 x 13 x 915 mm; weight = 2.4 kg/m

Tension Member - one external line at "hydrodynamic centre of effort"; 254 mm nylon, breaking strength = 1815 kg

Vertical Stiffeners -	only 30 cm segments unsupported
Anchor Points -	none
Handholds (spacing) -	1.2 m

OPERATIONAL DATA

Application

- designed for harbours and other protected waters
- applicable in up to sea state 1-2
- consider for use in sweeping mode at relative velocities of about 0.75 knot (1.4 km/h) or less; to be used in conjunction with SCOOP skimming barrier

Oil Containment

- tension member plus unique hinged flotation should allow boom to be towed so that it is stable and it is not prone to submerging, planing nor skirt deflection
- double flotation element should result in very good wave conformity
- freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

- elastomer/nylon fabric resists weathering, puncture, tearing and abrasion
- nylon tension line should assume substantial portion of forces acting upon barrier
- Ethafoam flotation is flexible yet durable
- rigid stiffeners frame flotation elements to add to boom's overall durability

Connection System

- slotted bar easily connects sections
- on-land or on-vessel preconnection of containment boom and skimming barrier is recommended
- disengagement of connection points is unlikely under indicated conditions of usage, including towing
- external tension line can be easily interconnected between sections

Ease of Use

- boom is compactible so that storage on a small work vessel is possible
- weight is moderately heavy but configuration allows for manual deployment
- hinged floats stow in full vertical position, launching is readily accomplished; care must be taken upon retrieval so that snagging does not occur
- external tension line must also be handled so it does not tangle
- field repairs, maintenance are relatively easy; cleaning requires attention to detail

Design Features

- boom has good reserve buoyancy and comprehensive construction detail
- design suggests launching and retrieval from work vessel are intended usages
- combination of containment and skimming barrier components makes the Harbor Boom highly available; only one side contacts oil
- only 30 cm sections are intermittant to fabric reinforcement

ADDITIONAL INFORMATION

1. Cohen, S. and S. Dalton, Self-Contained Oil Recovery System for Use in Protected Waters, Proceedings of the 1983 Oil Spill Conference, San Antonio, Texas (February 28-March 3, 1983).

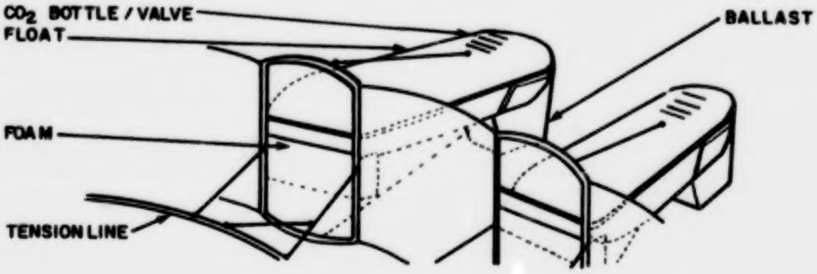
2. An Evaluation of Oil Pumps and Skimmers, Technology Development Report EPS 4-EC-81-4, Environment Canada (December, 1981).

3. Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing 1974-1979, EPA-600/9-81-007, US Environmental Protection Agency, Cincinnati, Ohio (January, 1981).

OFFSHORE BARRIER

(Offshore Devices Inc.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	122 cm
freeboard	53 cm
draught	69 cm
section length	187 m
shipping volume	36 m^3

Weight

per section	4675 kg
per unit length	25 kg/m

Fabric - International Orange or black, elastomer-coated nylon fabric

tensile strength	125 kg/cm
tear strength	136 kg
cold crack temperature	-40°C
weight	1400 g/m^2

Flotation - CO_2-inflatable outrigger floats of nitrile-PVC-coated nylon plus Ethafoam panels (behind steel panel)

shape, size	cylindrical outriggers are 33 cm x 122 cm; panels are 13 cm x 43 cm
buoyancy: weight ratio	3.3:1

Connector -	slotted bar

Ballast - 10 kg steel at strut bottom; 4.5 kg on outrigger bottom

dimensions	steel = 530 x 70 x 35 mm	lead = 280 mm (disc diameter)
weight	steel = 5.5 kg/m	lead = 2.5 kg/m

Tension Members - two double-braid polyester ropes: a 32 mm external tension line breaking strength = 22 225 kg and a 16 mm slack line breaking strength = 6000 kg

Vertical Stiffeners -	1.8 m
Anchor Points -	24 m
Handholds -	none

OPERATIONAL DATA

Application

* designed for exposed locations including outer harbours and offshore spills
* applicable in up to sea state 3
* consider for deployment in sweeping mode at 0.75 knot (1.4 km/h) when used in conjunction with Offshore Device's skimming and pumping system

Oil Containment

* outrigger float plus external tension line render boom highly stable under tow
* individual flotation elements result in good wave conformity; the boom resists submerging, planing and skirt deflection
* freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

* elastomer/nylon fabric resists weathering, puncture, abrasion and tearing
* main tension line has high strength; slack lines have moderate strength
* construction detail includes two-ply fabric, rigid panelling, reinforced rigid flotation and robust ballast bucket; all add to overall durability of boom
* container is integral part of system affording protection against damage

Connection System

* skimming and containment/deflection sections are usually preconnected prior to use
* slotted bar has very low probability of disengagement under indicated conditions of usage, including towing
* external tension line can be easily interconnected between sections if necessary

Ease of Use

* boom is designed for storage in a floatable container used for deployment
* occurrences during deployment/operation include failure of automatic inflation, twists or damage in barrier and/or tension and slack lines, and difficulties in connecting skimming and pumping unit; careful maintenance should prevent these
* a highly trained crew is essential to the launching and operation of the boom
* retrieval, cleaning, and repacking require a considerable length of time
* once properly deployed, the barrier can be easily utilized; regular inspection is recommended particularly if the skimming/pumping system is used

Design Features

* automatic release of CO_2 inflates boom upon extraction from container
* construction detail includes Ethafoam within steel panels comprising the rigid flotation, galvanized steel struts, steel ballast at strut bottoms and lead in outriggers
* repair kits are available
* standard boom length is 187 metres with 1.83 m lengths fabricated as needed

ADDITIONAL INFORMATION

1. J.L. O'Brien, National Strike Force Response Ixtoc 1 Blowout - Bay of Campeche, Proceedings of the 1981 Oil Spill Conference, Atlanta, Georgia (March, 1981).

2. Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing 1974-1979, EPA-600/9-81-007, US Environmental Protection Agency, Cincinnati, Ohio (January, 1981).

3. Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Oil Containment Booms, Report No. CG-D-78-78, US Coast Guard, Washington, D.C. (November, 1978).

Oil Recovery International
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Christchurch
Dorset BH23 1J3, England
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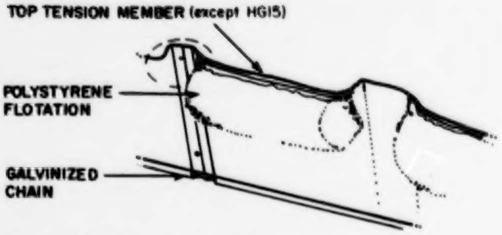
telex 41354 a/b OILMOP G

HARBOURGARD HG 15, 22, 30 & 40

price (point of manufacture
$US/section effective 6-1-83)

HG15	$425
HG22	$995
HG30	$1250
HG40	$1480



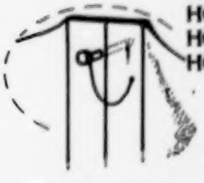


PLATE CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	HG15	HG22	HG30	HG40
overall height	38 cm	66 cm	78 cm	84 cm
freeboard	13 cm	20 cm	32 cm	38 cm
draught	25 cm	46 cm	46 cm	46 cm
section length	15 m	31 m	31 m	31 m
shipping volume	0.4 m^3	1.8 m^3	2.5 m^3	7.2 m^3
Weight				
per section	37 kg	82 kg	160 kg	205 kg
per unit length	2.4 kg/m	2.7 kg/m	5.2 kg/m	6.8 kg/m

Fabric (all models) - orange, PVC-coated nylon (HG 15); others PVC polyester

tensile strength	60 kg/cm
tear strength	45/45 kg
cold crack temperature	-20°C
weight	655 g/m^2

Flotation (all models) - round				
diameter	15 cm	20 cm	30 cm	38 cm
material type	expanded polystyrene solid in all models			
buoyancy: weight ratio	5:1	8:1	8.8:1	9.5:1
Connector -	interleaving aluminum plate in all models			
Ballast/Lower Tension Member -	(galvanized chain in all models)			
dimensions	6 mm	8 mm	9.5 mm	9.5 mm
weight	0.85 kg/m	1.3 kg/m	3.5 kg/m	3.5 kg/m
breaking strength	700 kg	1193 kg	3000 kg	3000 kg
Top Tension Member -	none	polyester	wire rope	wire rope
dimensions		12 mm	6 mm	8 mm
breaking strength		2200 kg	1320 kg	2050 kg

Other Data - anchoring points every 5 mm in all models; no handholds, vertical stiffeners

OPERATIONAL DATA

Application

* HG 15 suitable for calm inland waters and inshore use; HG 22, 30 and 40 designed for semi-protected waters and more general nearshore applications
* HG 15 applicable in up to sea state 1; other models in up to sea state 2
* consider all booms primarily for stationary containment for work periods of several days to one week; angled oil deflection in currents of 1-1.5 knots (1.8 to 2.8 km/h) should also be possible; HG 15 should divert oil in currents less than 1 knot (1.8 km/h)

Oil Containment

* tension members top and bottom (HG 15 has lower chain only) plus cylindrical flotation elements render booms highly stable; all models should have excellent resistance to submerging, planing and skirt deflection
* high reserve buoyancy plus circular floats should provide good wave conformity
* freeboard is particularly high in HG 22, 30 and 40 and draught adequate, splashover and drainage are unlikely under indicated conditions of use; the HG 15 is intended for calm water only, where its 13 cm freeboard is appropriate

Strength and Durability

* high weight fabrics should resist weathering, puncture, abrasion and tearing
* "high-frequency" welded seams reduce the likehood of disengagement
* single or double tension members provide additional strength qualities to boom
* high density expanded polystyrene flotation is durable and should withstand impact from debris; a PVC envelope enclosing each float provides additional protection
* ballast chain shackled to end plates evenly distributes forces acting upon boom; fabric is reinforced towards plates

Connection System

* aluminum plates slide easily together to join sections together; all ends are compatible
* three locking pins secure each connection; no tools are required
* ballast chain is permanently shackled to connector plates
* connections should be checked regularly, if possible, should prolonged exposure to higher sea states (3 or greater) be necessary

Ease of Use

* HG 15 is relatively compactible; however, larger models, particularly HG 40, require preplanning of storage and transportation needs
* smaller HG 15 and 22 are relatively lightweight and easy to handle; heavier HG 30 and 40 may require mechanical assistance for retrieval
* all booms are smooth-sided with tension members and flotation fully enclosed; deployment and recovery should be snag-free
* all models should be easily repaired, cleaned and maintained

Design Features

* comprehensive design and construction are appropriate for indicated usage
* details include integral pockets for tension members, envelope for flotation, tapered ends of floats, interconnectable ends, and fabric reinforcement next to connectors and at mooring points
* all metal components are corrosion-resistant
* fabric weight, welded and protected components should allow several reuses

Parker Systems Inc.
P.O. Box 1652
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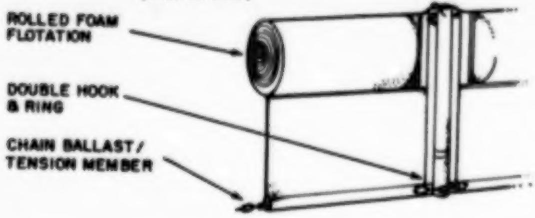
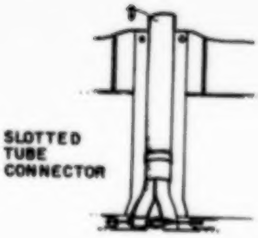
PSI BOOM Bantam, Basin Boom
Regular & Heavy Duty Boom
(RD & HD)





PHYSICAL SPECIFICATIONS

Dimensions	Bantam	Basin	RD	HD
overall height	18.4 cm	30.3 cm	45.7 cm	45.7 cm
freeboard	7.6 cm	10 cm	15.2 cm	15.2 cm
draught	10.8 cm	20.3 cm	30.5 cm	30.5 cm
section length	7.6 m	7.6 m	30.5 m	30.5 m
shipping volume	unspecified			
Weight				
per section	10.2 kg	11.5 kg	77 kg	91 kg
per unit length	1.34 kg/m	1.51 kg/m	2.53 kg/m	2.99 kg/m

Fabric (all models, exceptions noted in parentheses) - International Orange, nylon-reinforced vinyl

tensile strength	44.9/40.1 (26.4/26.4 Regular Duty Boom) (kg/cm)
tear strength	45 kg/cm
cold crack temperature	-40°C
weight	746 (610 in Regular Duty Boom) g/m^2

Flotation - Ethafoam in Heavy Duty, rolled Microfoam in others

diameter	7.6 cm	10 cm	15.2 cm	15.2 cm
segment length	1.83 m (all models)			
buoyancy: weight ratio	unspecified			

Connector - slotted tube slides over thickened boom edges; reinforced by double hook and ring (except Bantam)

Ballast/Lower Tension Member - 6.35mm galvanized chain in all models except Bantam which has galvanized steel washers weighing 0.75 kg/m riveted to skirt hem

Handholds - optional in RD and HD models only at fold points (every 1.83 m)

Anchor Points - optional in RD and HD models only at 15.2 m intervals

Other Data - material junctures sealed not stitched; optional Ethafoam flotation in Basin Boom; 15.2 m section length available for all models

OPERATIONAL DATA

Application

* Bantam: low velocity streams, creeks, swamps; Basin: calm, inland waters, settling basins, ponds; RD and HD Booms: inshore applications including lakes and rivers
* Bantam and Basin models applicable to calm water only; RD, HD Booms should function well in up to sea states 1-2
* consider all booms for stationary deployment for work periods of several days to several weeks; RD boom should be used for shorter intervals--up to one week; Basin, RD and HD models should deflect oil in currents of 1 knot (1.8 km/h) or less

Oil Containment

* cylindrical flotation element plus bottom tension chain should render boom highly stable with excellent resistance to submerging, planing and skirt deflection; Bantam may undergo some skirt deformation if placed in currents approaching 1 knot (1.8 km/h)
* all booms should override small waves; Bantam, Basin are most effective in calm water
* freeboard and draught are generally of adequate size to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* nylon/vinyl fabric is highly resistant to weathering, puncture, abrasion and tearing; RD Boom has lower tensile strength and weight
* ultrasonically-sealed seams should not disengage when stressed
* RD and HD models include double fabric chain pocket
* lower tension lines (exception: Bantam Boom) have very high ultimate strength
* Ethafoam closed cell foam resists impact from debris

Connection System

* slotted tube slides quickly over thickened ends and is held by safety toggle; no tools are needed
* a double-hook-and-ring interconnects sections of tension line (except Bantam)
* connector should hold in up to sea state 2; undertake regular inspections of connections upon prolonged exposure (several days) to higher sea states (3-4)

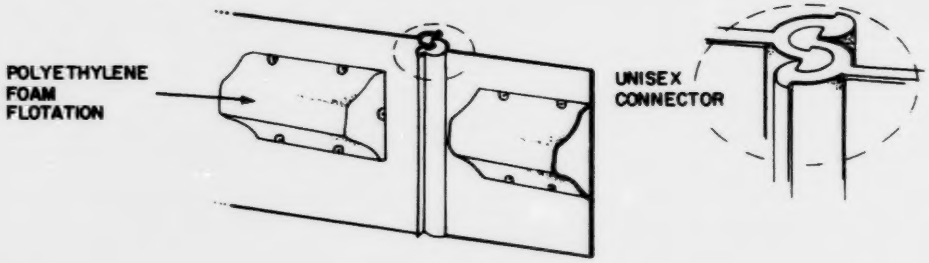
Ease of Use

* booms are not highly compactible for their size although small overall heights lessens storage and transportation concerns
* booms are of moderately lightweight and should be easily handled, deployed and retrieved without mechanical assistance
* smooth sides with fully encased flotation, chain allow snag-free use
* booms are easily cleaned; maintained and repaired

Design Features

* rolled foam flotation offers superior qualities of strength and resilience
* stainless steel plates used to transmit loads between sections of tension members (except Bantam which utilizes lead rods placed in plastic tubing)
* slotted tube fabricated from rigid PVC and reinforced with steel band
* fabric weight (except for RD) is relatively high for smaller size booms so that at least several reuses should be expected if booms are not abused

SPILL MASTER PERMANENT BOOM (Models 24 & 36 -URE) price upon request
(Parker Systems Inc.)



PHYSICAL SPECIFICATIONS

Dimensions	24-URE	36-URE
overall height	60.9 cm	91.5 cm
freeboard	25.4 cm	30.5 cm
draught	35.5 cm	61.0 cm
section length	12.2 m	12.2 m
shipping volume	unspecified	
Weight		
per section	112.5 kg	163.3 kg
per unit length	9.2 kg/m	13.4 kg/m

Fabric (both models) - black (with orange flotation), urethane-coated (optional PVC-coated) polyester

tensile strength	242 kg/cm
tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified

Flotation - trapezoidal in both models polyethylene exterior, closed cell foam interior

buoyancy: weight ratio	unspecified

Connector - interlocking unisex connector, extruded polyolefin

Ballast - lead weights fastened by stainless steel bolts; weight, spacing unspecified

Anchor Points - at each connector (every 12.2 m)

Other Data - no handholds, vertical stiffeners, tension members; all fasteners stainless steel

OPERATIONAL DATA

Application

* permanent installations or long-term usage where fabric durability is necessary
* 24-URE applicable up to sea state 1-2; 36-URE applicable up to sea state 2-3
* consider primarily for stationary containment; for prolonged work periods

Oil Containment

* rigid fabric in combination with external foam flotation should enable boom to assume a full upright position with little chance of submerging
* planing and skirt deflection should be minimal in currents up to 0.5 knot (0.9 km/h)
* individual floats should allow good wave conformity in spite of fabric rigidity
* freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

* urethane/polyester fabric is very high weight and has excellent resistance to weathering, puncture, tearing and abrasion
* closed-cell foam floats are polyethylene-sealed to resist impact as well as abrasion from piers and pilings
* lead ballast and floats are bolted to boom fabric

Connector System

* extruded polyolefin connectors slide easily together; no tools are required
* two latching plates secure each connection
* no male/female distinction allows interconnection of any sections
* connector plates are bolted over their entire height in boom fabric
* boom is relatively heavy, in-water connections are not recommended

Ease of Use

* booms are not highly compactible; this should be of less concern for a permanent or long-term use boom
* weight is relatively heavy and mechanical assistance is necessary for handling and retrieval
* design of floats should allow snag-free launching and recovery
* both boom fabric and sealed flotation are easy to clean; floats and ballast weights can be individually replaced if necessary

Design Features

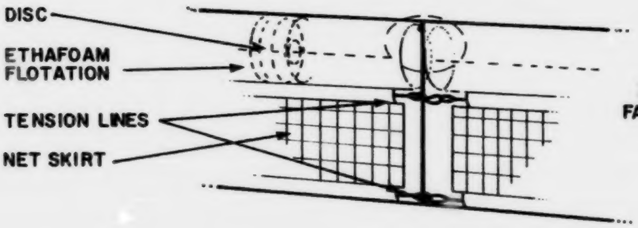
* overall design is simple but appropriate for the intended usage of the boom
* each connector includes lifting points for use with mechanical power when moving boom
* a Y-shaped clevis bolt and backing plate allow boom to ride up and down with the tide; the arrangement is simple and reduces the chance of abrasion
* rugged construction of floats, high fabric weight and good seakeeping potential combine to make boom suitable for a variety of applications including emergency usage

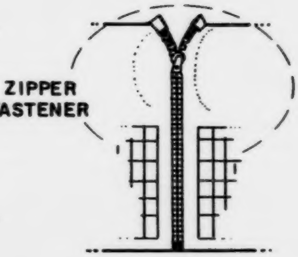
Rhin-Rhone
Department Antipollution
7, rue du Cirque
7500 8 Paris, France
telephone (33)(1)225-90-10
telex 290-521

IRHR TYPE 22 and 13

price (point of manufacture
F. Frs/m effective 1-2-82)

13 cm diameter 250 000
22 cm diameter 300 000





PHYSICAL SPECIFICATIONS

Dimensions

overall height	66 cm
freeboard	21 cm
draught	45 cm
section length	10 m
shipping volume	unspecified

Weight

per section	25 kg
per unit length	2.5 kg/m

Fabric - International Orange, PVC envelope (with polyamide net skirt having 100 mm^2 openings)

tensile strength	117.8 kg/cm
tear strength	unspecified
weight	unspecified

Flotation - floats 22 cm in diameter; 31 @ 15 cm long and 2 @ 20 cm long (at each end)

material type	Ethafoam
special features	floats held together by 8 mm polypropylene line at 15 cm intervals maintained by polypropylene discs and plastic spacers

Connector - sliding zipper fastener on 25 mm-wide nylon strip (supplemented by tension members)

Tension Members - bottom and waterline 7.5 or 10 mm galvanized steel cables, PVC-coated, connected by shackles or removable chain links; these also serve as ballast

Other Data - Type 13 Boom is identical to Type 22 with the following exceptions: the freeboard is 13 cm; the weight is 1.8 kg/m; and the total tensile strength is 4000 kg

OPERATIONAL DATA

Application

* Type 22 - harbours, semi-protected waters and general nearshore use; Type 13 - suitable for inland waters
* Type 22 - applicable in up to sea state 1-2; Type 13 - applicable in up to sea state 1
* consider for deployment in both stationary and current situations (up to 1 to 1.5 knots (1.8 to 2.8 km/h)) for work periods of several days to several weeks -or longer (Type 22 only)

Oil Containment

* combination of double tension members and cylindrical flotation should render boom highly stable; very good resistance to submerging, planing and skirt deflection
* shorter, individual floats should result in very good wave conformity
* freeboard is sized adequately to prevent splashover in Type 22 but its size in Type 13 restricts usage to relatively calm water; drainage may occur through netting in short but steep breaking waves but draught should otherwise be sufficient

Strength and Durability

* PVC has high tear strength and is resistant to weathering; it should not be prone to puncture or damage due to abrasion; Type 13 has lower fabric strength qualities
* twin steel cables add considerably to overall strength of boom
* Ethafoam flotation is durable and should resist impact from debris; discs, spacers and line in freeboard section will not likely add to boom's durability
* all fabric junctures thermally welded so that disengagement is unlikely

Connection System

* Zipper fasteners are easily slid together but require matching correct section ends
* on-land or on-vessel preconnection is required for proper alignment of ends and shackling of adjacent sections of tension cables
* disjuncture of zippers may occur in excessive currents (greater than 1.5 knots (2.8 km/h)) or higher sea states if prolonged exposure under load is necessary; cables will always keep entire length of boom together as unit even if separation at zipper(s) should occur
* connectors are not compatible with most other barriers

Ease of Use

* booms are moderately compactible because of netting in skirt
* booms are light-to-medium weight and should be readily handled, deployed and retrieved without mechanical assistance
* netting and exposure of double cables at points of connection require that care be taken to avoid snagging on projections
* booms are not easily cleaned because of polyamide netting; internal polypropylene line may require periodic attention

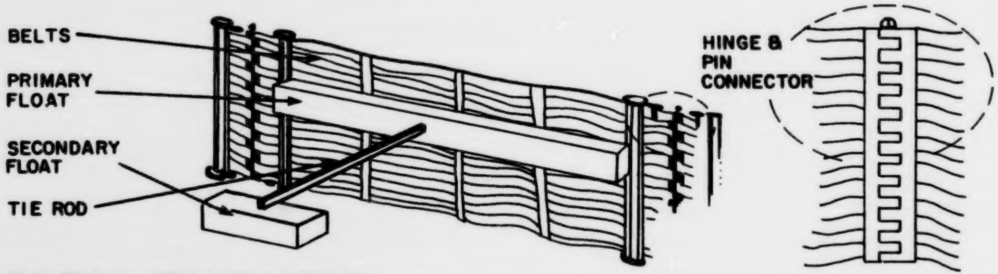
Design Features

* system of flotation elements, discs, spacers and polypropylene rope is relatively complex; because it is internal to the boom, maintenance problems could arise
* cables are PVC-coated; fabric is reinforced by nylon strip at attachment of zipper; section lengths enable easy handling
* high fabric weight, thermal seals, enclosed flotation and twin cables should allow several reuses of boom
* netting is of questionable value in increasing performance potential in currents

Rolba
Department Marine
11, 15 bd Paul-Langevin
B.P. 3-F 38600 Fontaine, France
telephone (33)(76)25.58.72
telex 320780 a/b ROLBA FONTAINE

ROLIP BOOM

price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	140 to 200 cm
freeboard	70 cm
draught	70 to 130 cm
section length	48 m
shipping volume (two sections)	30.9 m^3

Weight

per section	1296 kg
per unit length	27 kg/m

Fabric - black with orange floats and supports nylon fiber-reinforced polyethylene belts

tensile strength	100 kg/cm
tear strength	unspecified
cold crack temperature	-10°C
weight	unspecified

Flotation - 3-m primary floats attached to boom; 1-m secondary floats attached via 2-m tie rod

material type	steel box filled with closed-cell foam
buoyancy: weight ratio	3:1

Connector - steel hinge and pin

Ballast - weighted "dip rods", two per primary float; weight unspecified

Other Data - handholds, anchoring points unspecified; individual belts serve as both tension members and boom fabric

OPERATIONAL DATA

Application

- designed for semi-protected bodies of water and more exposed locations
- applicable in up to sea state 2
- consider for long periods (several weeks or more) of deployment in stationary mode; outrigger flotation should permit usage in currents of less than 1 knot (1.8 km/h)

Oil Containment

- main flotation elements plus outrigger-style pontoons should render boom stable
- boom should resist planing and skirt deflection in low currents with wave conformity generally adequate but deteriorating in short, breaking wave forms
- draught is adequate to prevent drainage under indicated conditions of use; some splashover may occur as waves break against flotation units or boom proper

Strength and Durability

- polyester/polyethylene belts plus PVC/nylon fabric have high strength qualities; should adequately resist weathering, puncture, abrasion and tearing
- double construction as well as individual belts should increase overall durability
- foam-filled floats are galvanized steel; however, outrigger design makes them susceptible to damage if repeated contact or sudden impacts should occur
- steel stiffeners toward connectors add to overall strength

Connection System

- steel hinge-and-pin connectors require alignment on land but slide easily
- connector is ruggedly constructed and suited for long-term deployment
- wheel on end of vertical stiffeners at connectors facilities interconnection
- substantial weight of sections and configuration of boom requires horizontal assembly on flat or gently-sloping area near site of deployment

Ease of Use

- boom's high weight coupled with complex arrangement of floats, stiffeners and connectors requires preplanning of deployment location and timing of boom assembly, launching and retrieval must all be considered
- one side only is suitable for the deflection or containment of oil
- the projecting primary and secondary flotation elements with connecting tie rods, the many individual belts, and the stiffener/connectors require that due attention be paid so that snagging does not occur during deployment and retrieval
- the boom would not likely be easily cleaned, maintained nor repaired

Design Features

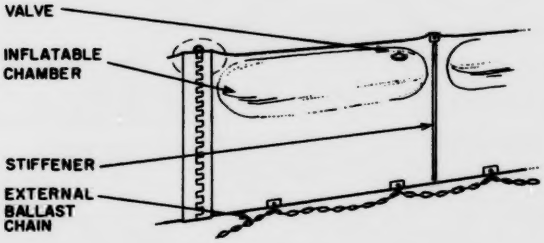
- boom has adequate reserve buoyancy
- overall design is complex in view of many components
- special launching facilities must be considered; horizontal assembly is required
- section weight is very high; container/trailer can be purchased to assist handling

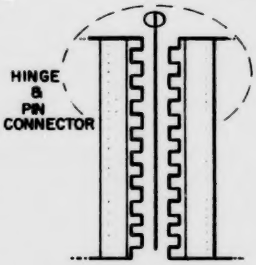
Raulands Fabriker A/S
DK-5260 Odense S.
Denmark
telephone (45)(09)11 55 15
telex 59 873

RO-BOOM BAY & CLASS OSA BOOMS

price (point of manufacture $US/m
effective 18-1-83, 200 m basis)

Bay Model $210
Class OSA $260





PHYSICAL SPECIFICATIONS

Dimensions	Bay	OSA
overall height	150 cm	220 cm
freeboard	55 cm	65 cm
draught	70 cm	130 cm
section length	200 m	202 m
shipping volume	2.5 m^3	3 m^3
Weight		
per section	2600 kg	3600 kg
per unit length	13 kg/m	18 kg/m

Fabric (both models) - black with yellow labels multiple plies of synthetic fabric vulcanized with synthetic oil-resistant rubber (Du Pont Neoprene)

tensile strength	400 kg/cm
tear strength	75 kg
cold crack temperature	-40°C (-60°C storage)
weight	5500 g/m^2

Flotation - air inflatable cylindrical chambers in both models

length (volume)	600 cm (950 L)	285 cm (500 L)
number per section	31 cm	62 cm
buoyancy: weight ratio	11.7:1	9.5:1

Connector - 3 mm stainless steel hinge-and-pin

Ballast/Lower Tension Member - external 13 mm galvanized chain, weight = 3.8 kg/m and maximum working load = 20 000 kg

Vertical Stiffeners (spacing) -	6.4 m	3.3 m
Anchor Points (spacing) -	1.6 m	1.65 m

Other Data -no top tension member; handholds optional; storage container, winch, power pack also available

OPERATIONAL DATA

Application

* both booms suitable for open water use including outer harbours and offshore
* applicable in up to sea state 3; boom should survive higher sea states if necessary
* consider primarily for stationary containment for work periods of several weeks and longer; oil deflecting (sweeping) should also be possible in currents of about 0.75 to 1 knot (1.4 to 1.8 km/h) or less

Oil Containment

* cylindrical air chamber plus bottom tension chain should render booms highly stable; excellent resistance to submerging, planning and skirt deflection
* flotation has high reserve buoyancy to provide excellent wave conformity
* freeboard and draught are adequate to prevent splashover and drainage

Strength and Durability

* vulcanized neoprene/polyester and polyester and polyamide fabric is very high weight and resists weathering, puncture, abrasion and tearing
* multiple-ply material has sealed junctures which should not disengage when stressed
* bottom tension member has very high ultimate strength which should add to durability of boom if its assumes significant portion of loading
* air is only means of flotation; if puncture occurs, loss of freeboard results

Connection System

* connectors slide easily together; disengagement in high sea states is unlikely
* male/female ends, shackling of adjoining lengths of tension members, and size and weight of boom require on-land or on-vessel preconnection
* connecting plates are comprehensively secured over their entire height to boom

Ease of Use

* air compressor is needed for inflation
* booms are relatively compactable for their size
* both booms are very heavy and mechanical assistance (a storage winder is available) must be considered
* smooth sides should allow easy handling; external tension chain requires some attention so that snagging does not occur during deployment or retrieval
* booms are easily cleaned and maintained; field repairs should be possible

Design Features

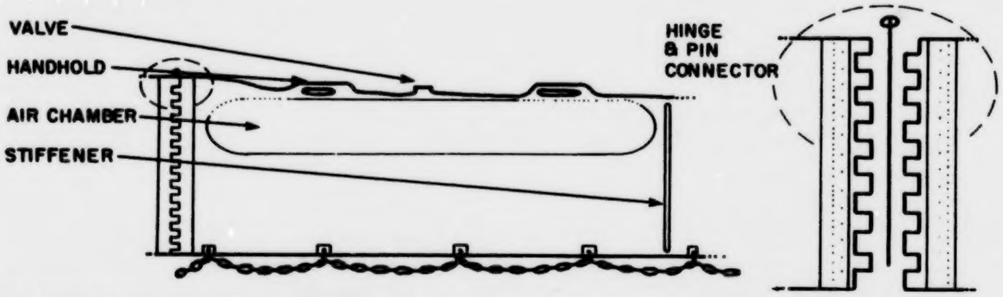
* shorter floats of OSA should permit slightly superior wave conformity
* both booms include handling eyelets and stainless steel plate for ballast chain
* extra ballast and stabilizers are available
* optional power pack housing compressor can be used with storage winder

ADDITIONAL INFORMATION

Tests of Ro-boom were scheduled for November 1983 involving the Canadian Coast Guard's Mulgrave, Nova Scotia base.

RO-BOOM River Model
(Roulands Fabriker A/S)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions

overall height	60 cm
freeboard	21 cm
draught	30 cm
section length	25 m
shipping volume	0.15 m^3

Weight

per section	74 kg
per unit length	3 kg/m

Fabric - black with yellow labels, oil-resistant rubber reinforced by two plies of polyester/polyamid fabric

tensile strength	200 kg/cm
tear strength	unspecified
cold crack temperature	-35°C
weight	unspecified

Flotation -	air-inflatable cylindrical chamber
dimensions	200 x 18 cm
number per section	12
buoyancy: weight ratio	8.3:1

Connector -	3 mm stainless steel hinge connector

Ballast/Lower Tension Member - external galvanized chain, maximum working load = 4800 kg, size and weight unspecified

Vertical Stiffeners (spacing) -	2.13 m
Anchor Points (spacing) -	53 m(or along chain)
Handholds (spacing) -	1 m

Other Data - no top tension member; storage container, winch, power pack also available

OPERATIONAL DATA

Application

- protected bodies of water including lakes and rivers and other nearshore situations
- applicable in up to sea state 1-2
- consider for oil containment in both stationary conditions and currents of 1 knot (1.8 km/h) or less for work periods of several days to several weeks

Oil Containment

- cylindrical air chamber plus bottom tension chain should render boom highly stable with very good resistance to submerging, planing and skirt deflection
- flotation has high reserve buoyancy; very good wave conformity should result
- freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

- vulcanized neoprene/polyester/polyamide fabric has high tensile strength and weight; expect very good resistance to weathering, puncture, tearing and abrasion
- vulcanized, multiple-ply fabric should not disengage at seams when stressed
- tension chain has high ultimate strength and should assume significant loading
- air chamber means puncture would result in sinking of damaged section

Connection System

- piano hinge connectors and rod slide easily together; disengagement is unlikely
- male/female ends, shackling of adjoining lengths of tension members, and size and weight of boom require on-land or on-vessel preconnection
- connectors are secured over their entire height to boom by multiple rivets

Ease of Use

- air compressor is required for inflation of flotation elements
- boom is highly compactable; storage/transportation needs are of minor concern
- smooth sides, lightweight and eyelets allow easy handling although external tension chain may snag during deployment and retrieval if care is not taken
- booms are easily cleaned and maintained; field repairs should be possible

Design Features

- handles are incorporated into fabric; connectors and chain mounts consist of stainless steel plates securely mounted to boom
- two bar is available which should be considered for deployment in currents
- connectors are not compatible with most other types
- high fabric weight, high reserve buoyancy, and combination of air chambers and vertical stiffeners are all positive features of this boom

ADDITIONAL INFORMATION

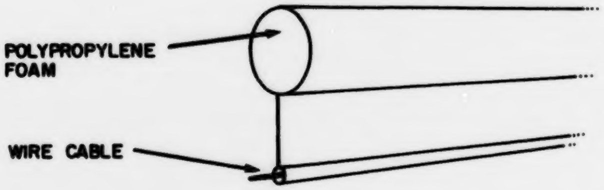
Testing of Ro-Boom was scheduled for November 1983 involving the Canadian Coast Guard base at Mulgrave, Nova Scotia.

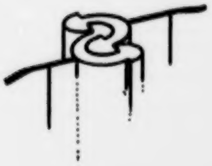
Samsel Services Company
1285 Old River Road
Cleveland, OH, 44113, USA
telephone (216)241-0333

STANDARD HARBOR BOOM

price (point of manufacture
$US/m effective 1-4-83)

$28.00





UNIVERSAL CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	
overall height	35.6 cm
freeboard	15.3 cm
draught	20.3 cm
section length	76.2 m
shipping volume	2 m^3
Weight	
per section	226.8 kg
per unit length	3 kg/m
Fabric -	yellow, PVC-coated polyester
tensile strength	181 kg/cm
tear strength	68 kg
cold crack temperature	-40°C
weight	746 g/m^2
Flotation -	cylindrical 10.2 cm in diameter
material type	unicellular polypropylene foam
buoyancy: weight ratio	4:1

Connector - universal connector, aluminum, with locking pin

Ballast/Lower Tension Member -	20 mm flexible steel wire rope
weight	1.5 kg/m
ultimate tensile strength	unspecified
Top Tension Member -	50 mm nylon webbing strap
ultimate tensile strength	2268 kg

Other Data - no anchor points, handholds or stiffeners; boom can be ordered in any size and length

OPERATIONAL DATA

Application

* calm inland waters including inner harbours and ponds, sea states 0-1
* consider primarily for stationary containment for work periods of several days to several weeks; deflection of oil in smooth-flowing currents of 1 knot (1.8 km/h) or less should also be possible

Oil Containment

* cylindrical flotation combined with bottom tension wire and top webbing should render boom very stable; very good resistance to submerging, planing and skirt deflection
* flotation element has good reserve buoyancy; boom should override small waves
* freeboard and draught are both relatively small; however, these should be adequate to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* PVC/polyester fabric is highweight and has medium-to-high tensile and tear strengths; it should resist weathering, puncture, abrasion and tearing
* double tension members should add considerably to the strength of this small boom if these assume a significant portion of the loading acting on it
* unicellular polypropylene foam should withstand impact from most forms of debris; it is totally encased within the boom fabric and is highly durable

Connector System

* universal connectors slide easily together, no tools are required
* a locking pin secures the connection
* in-water interconnections are possible because of the light weight of the boom
* tension members are fastened to connector plates

Ease of Use

* boom is not compactible for its size because of the configuration of the flotation so that storage and transportation needs should be considered
* weight is moderately light so that handling, deployment and recovery should not require mechanical means
* the boom's smooth sides plus the enclosed flotation and tension members should permit snag-free use
* booms are easily cleaned, maintained and repaired

Design Features

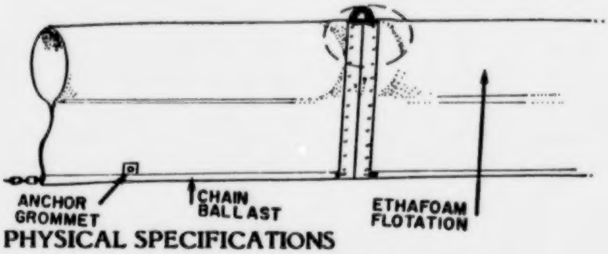
* Samsel Containment Boom is available in various section lengths, skirt heights and flotation sizes to meet specific needs
* the boom's steel cable and top nylon strap add considerably to strength and overall performance potential
* the high weight of the fabric in a small boom should allow at least several reuses
* the unicellular polypropylene foam is very durable making the boom suitable for use in harbours or other locations where debris infestations occur

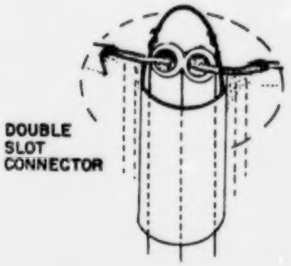
Sanivan Inc.
1705, 3ième Avenue
Pointe aux Trembles, Quebec H1B 5M9
Canada
telephone (514)353-9170
telex 05-829559

price (point of manufacture
$Cdn/ft effective 1-1-83)

SK 18/6	$20.00
SK 20/7	$21.00
SK 24/8	$22.00
SK 36/9	$39.00

SK BOOM SK 18/6, 20/7, 24/8 & 36/9





PHYSICAL SPECIFICATIONS

Dimensions	SK 18/6	SK 20/7	SK 24/8	SK 36/9
overall height	45.7 cm	50.8 cm	61 cm	91.5 cm
freeboard	15.2 cm	17.8 cm	20 cm	30.5 cm
draught	30.5 cm	33 cm	40.6 cm	61.0 cm
section length	15.2 m	15.2 m	15.2 m	15.2 m
shipping volume	0.56 m^3	0.8 m^3	0.75 m^3	2 m^3
Weight				
per section	59 kg	59 kg	61 kg	80 kg
per unit length	3.87 kg/m	3.87 kg/m	4.02 kg/m	5.25 kg/m

Fabric (all models) - yellow (other colours available), neoprene (optional fabrics--PVC/polyester

tensile strength	200/200 kg
tear strength	28/28 kg
cold crack temperature	-40°C
weight	750 g/m^2

Flotation - (cylindrical Ethafoam in all models except as noted)

diameter	15.2 cm	17.8 cm	20 cm	23 x 30 cm oval
buoyancy: weight ratio	3.75:1	6.5:1	6.4:1	8.5:1

Connector - double slot with handle, aluminum, flotation optional

Ballast/Lower Tension Member - 9.5 mm galvanized chain in all models; weight = 2.26 kg/m and breaking strength = 4550 kg

Top Tension Member - 6.35 mm galvanized coated cable all models; breaking strength = 3175 kg

Vertical Stiffeners - none

Anchor Points - optional

Handholds (spacing, all models) - 1 m

OPERATIONAL DATA

Application

* SK 18/6, 20/7 and 24/8: semi-protected bodies of water; SK 36/9 suitable for more exposed locations
* SK 18/6, 20/7, 24/8 applicable up to sea state 1-2; SK 36/9 up to sea state 2-3
* consider all booms for stationary containment and oil deflection in currents up to about 1 1/2 knots; usage periods of several weeks should be possible

Oil Containment

* tension members top and bottom plus round/oval floats render booms highly stale with excellent resistance to submerging, planing and skirt deflection
* all booms exhibit very good wave conformity
* freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

* coated polyester fabrics resist weathering, puncture, abrasion and tearing
* fabric is double stitched at seams; fabric coating is not altered by heat seal
* chain and cable tension lines add considerably to boom's overall strength
* Ethafoam flotation is flexible and durable

Connection System

* double-slotted connector is easily slid into place; chain fastens separately
* preconnection on-vessel or on-land is required because of shackling of tension chain
* coupler is suitable for use in quiescent and flowing water for short-term
* disengagement of connectors when stressed is highly unlikely

Ease of Use

* SK 36/9 is not compactible; preplanning storage/transportation suggested; other models are relatively compactable in site of cylindrical floats
* all booms are of light-to-medium weight; manhandling and deployment of three smaller booms should be easily done while mechanical assistance may be required for their retrieval as well as for more general use of the SK 36/9
* smooth sides and enclosed tension members should permit snag-free use of all booms
* cleaning, maintenance and field repairs should be easily accomplished

Design Features

* Sanivan custom designs booms for various applications to meet specific needs
* the SK series include a reinforced chain pocket, handles and enclosed floats
* connectors can be ordered which include foam flotation
* excellent stability characteristics, high material weight, double tension members and good overall design are positive aspects of the booms

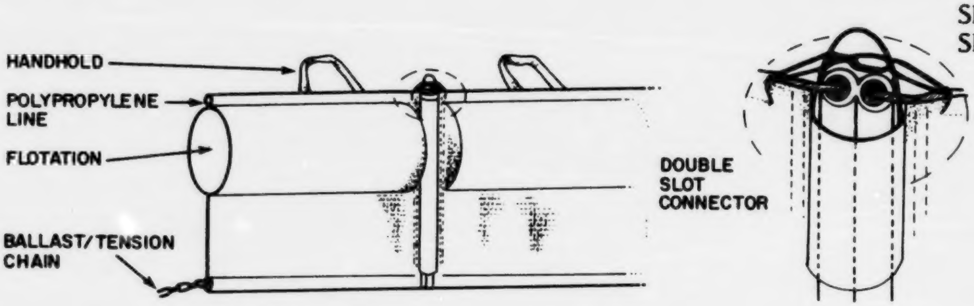
ADDITIONAL INFORMATION

Prairie Region Oil Spill Containment and Recovery Advisory Committee, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

SEMI-DISPOSABLE BOOM SK 14/4 and SK 18/6
(Sanivan Inc.)

price (point of manufacture
$Cdn/ft effective 1-1-83)

SK 14/4 $7.95
SK 18/6 $8.50



PHYSICAL SPECIFICATIONS

Dimensions	SK 14/4	SK 18/6
overall height	35.6 cm	45.7 cm
freeboard	11.4 cm	15.2 cm
draught	24.1 cm	30.5 cm
section length	15.2 m	15.2 m
storage volume	0.37 m^3	0.56 m^3
Weight		
per section	20 kg	34 kg
per unit length	1.3 kg/m	2.2 kg/m

Fabric (both models) - opaque white (other colours available) Fabrene (optional fabrics)

tensile strength	173/133 kg
tear strength	39 kg
cold crack temperature	-60°C
weight	200 g/m^2

Flotation - cylindrical Ethafoam segments in both models

diameter	10.2 cm	15.2 cm
buoyancy: weight ratio	4.3:1	6.5:1

Connector - double round slots with handle, extruded aluminum

Ballast/Lower Tension Member - 6.35 mm galvanized steel chain in both models; breaking strength = 2650 kg

weight	0.81 kg/m	1.6 kg/m

Top Tension Member -	9.5 mm polypropylene line
breaking strength	2120 kg
Vertical Stiffeners -	none
Anchor Points -	optional
Handholds -	nylon webbing spaced approximately 1 m apart

OPERATIONAL DATA

Application

* sheltered waters including lakes, bays and similar inshore situations
* applicable in up to sea state 1-2
* consider primarily for stationary containment for short-to-medium periods (several days to one week); should also deflect oil in currents of less than 1 knot (1.8 km/h)

Oil Containment

* tension members top and bottom plus cylindrical flotation elements render boom highly stable; excellent resistance to submerging, planing and skirt deflection
* short foam floats that flex within boom result in excellent wave conformity
* freeboard and draught are sized adequately to prevent splashover and drainage; smaller SK 14/4 may undergo splashover in short-period, breaking waves

Strength and Durability

* Fabrene material is lightweight but has good strength qualities; it should resist weathering, puncture, abrasion and tearing
* fabric seams are stitched in multiple rows not heat-sealed making them more prone to disjuncture should abrasion or prolonged exposure occur
* double tension members provide good strength qualities
* Ethafoam flotation is flexible and durable; it should withstand impact from debris

Connection System

* double-slotted connector slides quickly and easily into place; sections of tension chain and upper polypropylene line must be schackled together as separate operation
* preconnection on-vessel or on-land is required because of requirements to interconnect tension members
* the aluminum coupler is highly suited for its purpose; i.e., a good seal is created for both stationary and flowing conditions
* the extruded handle allows easy use of the connector while providing a means to prevent its loss since the upper tension line passes through it

Ease of Use

* boom is compactible to minimize storage and transportation needs
* boom's light weight, handholds permit easy handling, deployment and retrieval
* enclosed strength members and flotation result in a smooth-sided boom that is not prone to snagging
* open-weave fabric allows reuse but requires comprehensive cleaning

Design Features

* the chain pocket consists of a double layer or fabric
* nylon webbing reinforces section ends; nylon webbing also serves as handholds
* plastic thimbles form ends of sections of the polypropylene rope tension line
* the smaller SK 14/4 boom has a relatively low freeboard; however, the round flotation element flexes well and should allow inshore use of the boom
* although a "semi-disposable" boom, reuse of the SK should be considered

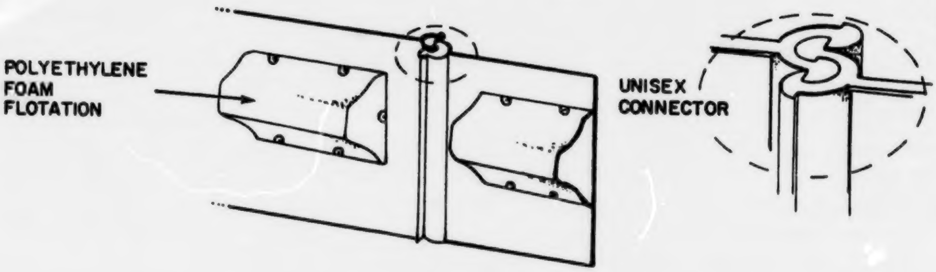
ADDITIONAL INFORMATION

Solberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

PERMANENT BOOM
(Sanivan Inc.)

price (point of manufacture
$Cdn/ft effective 1-1-83)

SB 16/6	$38.00
SB 24/8	$46.25
SB 36/8	$54.00



PHYSICAL SPECIFICATIONS

Dimensions	SB 16/6	SB 24/8	SB 36/8
overall height	40.6 cm	61 cm	91.5 cm
freeboard	13 cm	20 cm	30.5 cm
draught	27 cm	40.6 cm	61.0 cm
section length	15.2 m	15.2 m	15.2 m
shipping volume	1 m^3	1.9 m^3	2.85 m^3
Weight			
per section	85 kg	125 kg	150 kg
per unit length	5.66 kg/m	8.2 kg/m	9.8 kg/m

Fabric (all models) -	black, PVC (urethane optional)
tensile strength	215 kg/cm
tear strength	115 kg
cold crack temperature	-30°C
weight	5250 g/m^2

Flotation - cylindrical foam-filled high density polyethylene flotation in all models

	SB 16/6	SB 24/8	SB 36/8
diameter	15.25 cm	20 cm	20 cm
buoyancy: weight ratio	2:1	3:1	3:1

Connector - high-density PVC Oilfence Unisex type

Tension Members - none

Ballast - lead shot weighing 1.5 kg/m in SB 16/6 and 3 kg/m in other models

Vertical Stiffeners - none

Anchor Points - optional

Handholds (spacing, all models) - 1 m

OPERATIONAL DATA

Application

* permanent installations such as terminals or long-term use at a spill site
* SB 16/6 applicable in up to sea state 1; SB 24/8 applicable in up to sea state 1-2; SB 36/8 applicable in up to sea state 2
* consider for stationary containment of oil for working periods of several weeks to several months where relatively low currents (0.5 knot (0.9 km/h) or less) exist

Oil Containment

* rigid fabric plus cylindrical floats should enable the boom to assume a full upright position with good resistance to planing and skirt deflection in low currents
* splashover may occur in short-period, breaking wave due to the rigidity of the fabric but generally freeboard should be adequate to prevent this
* skirt depth is sufficient to prevent drainage
* wave conformance should be good in most wave forms

Strength and Durability

* fabric weight and strength are high; the boom should not be susceptible to weathering, tearing, puncture or abrasion
* foam flotation is high-density polyethylene which should not be prone to damage by most forms of debris
* the material does not include junctures (which could possible be points of wear)
* the boom does not incorporate tension members; the fabric assumes the loading; this does not detract from its strength but limits the boom to low-current usage

Connection System

* plastic fittings provide low friction, end-to-end connection; no tools are required
* locking pin mechanism remains in closed position once secured
* connector attaches via bolts over entire boom height; this results in even load distribution and low probability of disengagement
* connectors have no male/female distinction and may fit other systems

Ease of Use

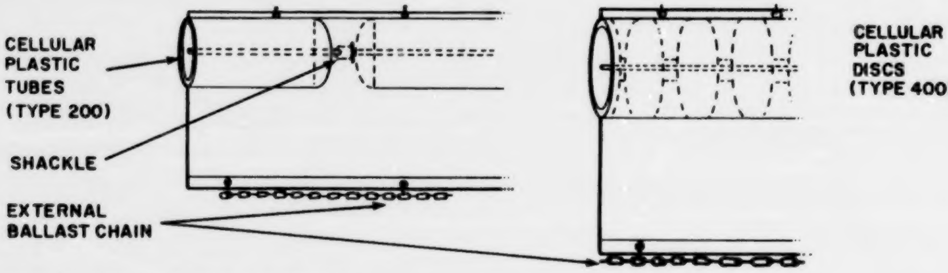
* booms range from being moderately compactible (SB 16/6) to having low compactibility (SB 36/8); of less concern for a permanent-type boom
* weight is relatively high for the size of boom so that mechanical assistance should be considered for handling, deployment (if appropriate) and retrieval
* connection ease should allow rapid deployment, less chance of snagging
* the non-porous belting material is easily cleaned and maintained; field repairs should be possible if required

Design Features

* the overall simplicity of design, resilient floats and conveyor material are highly suitable for a permanent boom
* optional urethane fabric as well as the lead ballast and PVC connectors are also well suited for the boom's intended usage
* various overall heights allow exact specifications to suit local sea conditions

Scandinavian Oil Service
Stora Badhusgatan 20
S-411 21 Gothenburg, Sweden
telephone (46)(031)17 85 30
telex 21 067 a/b STUART S

SOS PERMANENT BOOMS Type 200 & 400 price upon request


CELLULAR PLASTIC TUBES (TYPE 200)
SHACKLE
EXTERNAL BALLAST CHAIN
CELLULAR PLASTIC DISCS (TYPE 400)

PHYSICAL SPECIFICATIONS

Dimensions	Type 200	Type 400
overall height	60 to 95 cm	80 to 115 cm
freeboard/flotation	20 cm	40 cm
draught	40 to 75 cm	40 to 75 cm
section length	fabricated as required	
storage volume	unspecified	
Weight		
per unit length	3 to 6 kg/m	10 to 15 kg/m

Fabric - nylon-reinforced PVC in both models, characteristics unspecified

Flotation -	cellular plastic in sealed polyethylene tubes	sealed cellular polyurethane discs; six/metre
diameter x length	20 x 300 or 100 cm	40 x 15 cm
special features (see also Tension Members)	a load-bearing member runs through the centre of the flotation elements in each model	
Connector -	none required; the boom is ordered to length	
Tension Members -	galvanized 12 mm iron rod linked by galvanized shackles	13.5 mm parafil cable: Terylene core in polyethylene skin (optional 20 mm cable)
breaking strength	3000 kg	3560 (or 7820) kg
Ballast -	lead or galvanized external chain as required	

Anchor Points - along chain as required; pairs of buoys available for mooring points

Other Data - no vertical stiffeners, handholds

OPERATIONAL DATA

Application

* designed for long-term deployment at permanent installations such as terminals
* Type 200 generally applicable in sea states 1 and 2; Type 400 in sea state 2
* consider for stationary deployment modes including currents of about 1 to 1.5 knots (1.8 to 2.8 km/h) or less; working periods of several months should be possible

Oil Containment

* the cylindrical buoyancy element of the 200 and the flotation discs of the 400 coupled in each case with the dual tension members should produce excellent stability; very good resistance to submerging, planing and skirt deflection
* wave conformity should be very good due to circular cross-section of floats
* freeboard and draught are sized adequately to prevent splashover and drainage; a range of skirt depths is available

Strength and Durability

* nylon/PVC fabric should resist weathering, puncture, abrasion and tearing
* top and bottom tension members have high ultimate strength
* Type 400 flotation is cellular polyurethane discs reinforced with PVC, each sealed in a high-density skin
* Type 200 buoyancy utilized closed-cell plastic sealed in polyethylene tubes; both the 200 and 400 flotation elements should withstand debris infestations

Connection System

* no connectors are utilized since the boom is ordered to a prespecified length

Ease of Use

* booms are not designed to be highly compactible since their intended usage is long-term deployment at a known location
* booms are relatively heavy depending upon size; mechanical assistance is advised if regular deployment and retrieval are necessary
* exterior of booms can be easily cleaned; bottom tension chain can be cleaned separately and readily replaced if appropriate
* interior of both flotation systems involves multiple components which may require periodic attention if wear occurs

Design Features

* overall design should result in outstanding wave conformance and oil containment in currents; this is unusual for permanent booms
* anchor buoys attach in pairs through lines fastened to mooring points in the tension chain
* internal iron rods-and-shackle system of Type 200 and discs-and-cable arrangement of Type 400 could require maintenance over a long-term period
* a wide range of materials make up boom components: cellular plastic, polyethylene tubes, iron rods, galvanized chain, polyurethane discs, Terylene-core cable; more costly repairs may be necessary and/or contact with the manufacturer/distributor rather than jury-rigged or quickly fashioned replacements

Seaward International Inc.
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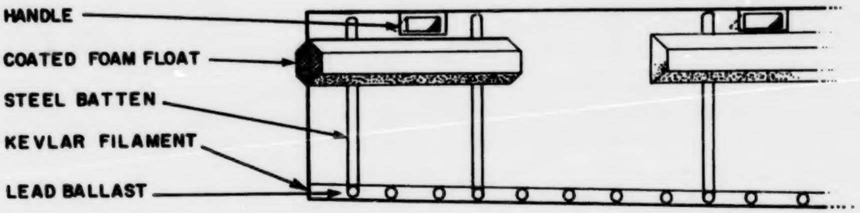
telephone (703)534-3500
telex 899-455

SEA FENCE Inner & Outer Harbor Boom



PHYSICAL SPECIFICATIONS

Dimensions	Inner Harbor	Outer Harbor
overall height	44.5 cm	71.0 cm
freeboard	19.0 cm	30.5 cm
draught	25.5 cm	40.5 cm
section length	15.2 m	15.2 m
shipping volume	1.8 m^3	1.8 m^3
Weight		
per section	59.2 kg	91.2 kg
per unit length	3.9 kg/m	6.0 kg/m

Fabric (both models) - orange or black, polyurethane-coated polyester fabric

tensile strength	102.4 kg/cm
tear strength	unspecified
cold crack temperature	-46°C
weight	unspecified

Flotation - hexagonal floats of solid, flexible closed-cell foam (ethylene-vinyl acetate); polyurethane-coated

length	0.6 m	0.9 m
buoyancy: weight ratio	2.9:1	3.2:1

Connector - US Navy, aluminum

Bottom Tension Member - Kevlar fibres along skirt hem in both models
tensile strength - 8730 kg (based on estimated strength of 35 fibres)

Ballast - lead weights: dimensions, weight and spacing unspecified

Vertical Stiffeners - internal flexible spring steel battens in both models

Handholds - (molded) urethane cast onto boom top

Spacing - 1.68 m 1.19 m

Other Data - no top tension member; anchor points unspecified; reel deployable

OPERATIONAL DATA

Application

- * Inner Harbor Boom suitable for inshore areas; Outer Harbor Boom is appropriate for semi-protected bodies of water
- * IH model applicable up to sea state 1; OH boom applicable up to sea state 1-2
- * consider both booms for stationary deployment where work periods vary from (several days to several weeks; angled deflection in low currents possible)

Oil Containment

- * hexagonal floats plus Kevlar member and steel stiffeners should allow the boom to assume a full, upright position in low or no current
- * the boom should remain stable and display good resistance to submerging; planing and skirt deflection may occur in currents 0.5 to 1 knot (0.9 to 1.8 km/h) or greater
- * the shape and reserve buoyancy of the floats should result in good wave conformity which is likely to deteriorate in short-period, breaking waves
- * freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

- * polyurethane/polyester fabric resists weathering, puncture, abrasion and tearing
- * the Kevlar tension member should add to overall tensile strength
- * ethylene vinyl acetate foam is closed-cell and coated with polyurethane; it is both flexible and durable and should withstand impacts from debris
- * polyurethane coating eliminates fabric junctures minimizing damage potential

Connection System

- * US Navy aluminum couplings interlock easily; a locking pin secures the connection; no tools are required
- * in-water connection of boom should be possible in calm conditions; preconnection of OH model on land is suggested because of higher weight
- * section ends must be properly aligned because of male/female connectors
- * mooring package, adaptor for other connectors, bulkhead assembly are available

Ease of Use

- * booms are not compactible but can be stored on a reel
- * relatively high weight of the OH model requires that mechanical assistance be used for launching and recovery; the IH boom is similarly heavy for its size so that mechanical retrieval should be considered
- * enclosed flotation/Kevlar line result in a snag-free smooth-sided boom
- * handholds assist manoeuvring although higher weight negates some utility
- * cleaning, maintenance and field repairs should be readily accomplished

Design Feaures

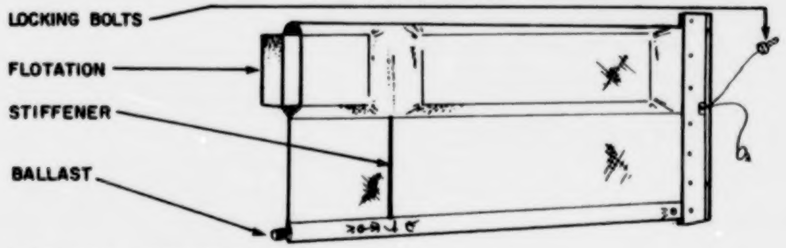
- * flotation, battens and Kevlar strength member are all coated with elastomer
- * lead ballast weights should afford protection for Kevlar fibres
- * outer elastomer coating has very high abrasion-resistance and weathering qualities
- * overall design is simple and well-conceived
- * at least several reuses of the boom should be possible

ADDITIONAL INFORMATION

Hubbell, P., F.A. March, L.S. Brown and G. Ruetenik, Development of New U.S. Navy Standard Oil Containment Boom, proceedings of the International Oil Pollution Prevention Conference and Exhibition, Hamburg, West Germany (September, 1978).

Sjuntorp AB
460 20 Sjuntorp, Sweden
telephone (46)(0520)40200
telex 42143 a/b SJUNTEX

SORS SCREEN Models 530 & 1030 & 2030 price upon request



PHYSICAL SPECIFICATIONS

Dimensions	530	1030	2030
overall height	50 cm	108 cm	153 cm
freeboard	20 cm	33 cm	45 cm
draught	30 cm	75 cm	108 cm
section length	10 m	25 m	25 m
shipping volume	0.15 m^3	1.4 m^3	2.5 m^3
Weight			
per section	30 kg	125 kg	200 kg
per unit length	3.0 kg/m	5 kg/m	8 kg/m

Fabric (all models unless otherwise specified) - orange, PVC-coated polyamide

tensile strength	120 kg/cm	120 kg/cm	236.2 kg/cm
tear strength	62 kg	62 kg	135 kg
cold crack temperature	-35°C		
weight	600 g/m^2	600 g/m^2	950 g/m^2

Flotation - rectangular segments of closed-cell polyethylene foam in all models

dimensions	24 x 100 x 2.5 cm	30 x 100 x 4 cm	45 x 100 x 6 cm
buoyancy: weight ratio	2:1 specified for 530 only		

Connector - zipper fastener in 530; overlapping aluminum plates and two locking pins in 1030 and 2030

Tension Member - none in all models

Ballast - sand-filled rubber hoses in all models plus galvanized chain in 2030

hose dimensions (Lxdia.)	100 x 6.8 cm	100 x 6.0 cm	100 x 9.8 cm
weight	2.5 kg/m	4 kg/m	7 kg/m

Vertical Stiffeners (spacing) -	none	1.3 m	1.4 m

Anchor Points - optional in 530; at section ends in 1030 and 2030

Handholds (spacing of pairs) -	none	1.3 m	1.4 m

OPERATIONAL DATA

Application

- model 530 - inland waters including lakes and ponds; model 1030 - semi-protected areas such as harbours; model 2030 - offshore applications
- 530 applicable in up to sea state 1; 1030 applicable in up to sea state 2; 2030 applicable in up to sea state 2-3
- consider all booms for quick containment of oil in stationary mode for several days to one week; model 2030 should deflect oil in low currents

Oil Containment

- potential stability increases from model 530 to 1030 to 2030; the 530 has only floats, the 1030 also includes stiffeners, and the 2030 utilizes a tension chain
- expect the booms to assume a full upright position under the above indicated conditions of usage; submerging, planing and skirt deflection should not occur
- rectangular flotation elements should provide adequate wave conformity; performance will likely reduce in short-period, breaking waves (particularly 530)
- freeboard and draught are sized adequately to prevent splashover and drainage; exceptions include washover should breaking waves or chop develop

Strength and Durability

- PVC-coated polyamide resists weathering, puncture, abrasion and tearing
- material problems associated with a rubber-coated nylon boom evaluated in the US should not apply to the Sors Screen barriers
- all fabric junctures are heat-welded so that their disjuncture is unlikely
- fabric tensile and tear strengths and tension chain of 2030 result in highest durability
- closed-cell polyethylene foam is flexible and durable

Connection System

- zipper fasteners of 530 are quick and easy to use; the boom should not be unduly stressed for prolonged periods or disengagement of sections could occur
- in-water connection of 530 is possible
- aluminum coupling bars of 1030 and 2030 slide quickly together with each connection secured by two locking pins; preconnection on land is recommended because of size and weight of booms
- avoid prolonged exposure of 1030 and 2030 Booms to higher sea states (greater than 3) since disconnection is a possibility under such circumstances

Ease of Use

- all booms are compactible; storage/transportation needs should not be a concern
- the 530 is easily handled without mechanical assistance; the 1030 and 2030 Booms usually need power assistance for deployment and retrieval
- smooth-sides and fully enclosed floats and ballast should allow snag-free use
- cleaning, maintenance and field repairs should be easily accomplished

Design Features

- ballast is sand-filled rubber hoses; these produce less chafing than a chain but do not provide tensile strength
- PVC/polyamide fabric is lightweight; however, its oil-resistance and weathering properties make it well-suited for slick containment
- handholds and anchoring points are standard features of the 1030 and 2030
- compactability, internal components, and easy-to-use connectors are good features

ADDITIONAL INFORMATION

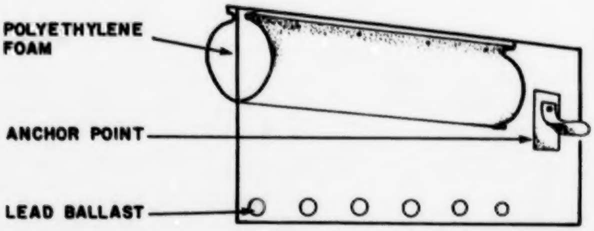
Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Oil Containment Booms, Report No. CG-D-78-78, US Coast Guard, Washington, D.C. (November, 1978).
Note that this reference reports evaluation results for another Sjuntorp Boom. The Sors Screen products appear to offer improved capability over the boom tested in 1977.

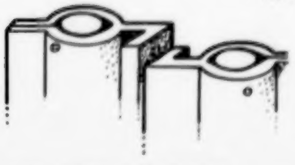
Slickbar Inc.
250 Pequot Avenue
P.O. Box 139
Southport, CT, 06490, USA
telephone (203)255-2601
telex 643458 a/b DACCO SNO

Mk 7, 10 & 12 (Standard models)

price (point of manufacture
$US/ft effective 15-4-82)

Mk 7	$32.15
Mk 10	$21.45
Mk 12	$16.15





PHYSICAL SPECIFICATIONS

Dimensions	Mk 7	Mk 10	Mk 12
overall height	61 cm	35.6 cm	35.6 cm
freeboard	20.3 cm	12.7 cm	12.7 cm
draught	40.6 cm	22.9 cm	22.9 cm
section length	3.05 m	1.52 m	1.52 m
shipping volume	1.37 m^3	0.85 m^3	0.85 m^3
Weight			
per section	19 kg	7.26 kg	7.26 kg
per unit length	6.25 kg/m	4.78 kg/m	4.78 kg/m

Fabric (all models) - urethane - coated Kevlar Aramid 29

colour	black	black	grey
tensile strength	178.7 kg/cm (all models)		
tear strength	204/204 kg	204/204 kg	68/77 kg
cold crack temperature	-54°C (all models)		
weight	1187 g/m^2	1187 g/m^2	1356 g/m^2

Flotation - (semi-circular polyethylene foam elements in all models)

dimensions (diameter x length)	26.6 x 61 cm	16.5 cm x 127 cm	16.5 x 127 cm
buoyancy: weight ratio	4.95:1	6.13:1	6.13:1
special features	bolted into skirt for quick replacement		

Connector - vertical interlocking, aluminum

Ballast - hardened antimony lead 41.4 mm in diameter in all models

Anchor Points (spacing) -	15.2 m in all models
Handholds -	top edge of each flotation pair
Other Data -	no tension members or vertical stiffeners

OPERATIONAL DATA

Application

* Mk 7 intended for semi-protected bodies of water including lakes and harbours up to sea state 1-2; Mk 10 and 12 designed for use in nearshore areas or other more sheltered situations, up to sea state 1
* consider all booms primarily for stationary containment of oil either on emergency basis or for long-term deployment (periods of several months); Mk 12 is suitable for shorter working periods of several days to several weeks

Oil Containment

* prominent floats in combination with fairly rigid boom fabric should result in the barrier assuming a full upright position
* the reserve buoyancy of the flotation is moderately high which should result in adequate wave conformity with a low probability of submerging
* planing, skirt deflection only if current exceeds about 1 knot (1.8 km/h)
* freeboard and draught should be generally adequate to prevent splashover and drainage under indicated conditions of use; however, some oil losses may occur over the boom in short-period, breaking waves

Strength and Durability

* urethane/Kevlar fabric is very high weight and has excellent resistance to weathering, puncture, abrasion and tearing; Kevlar/polyester material of Mk 12 has lower tensile strength
* the manufacturer has continuously upgraded overall strength qualities and durability; the polyethylene foam floats now are covered with a hard oil-and weather-resistant skin unlike earlier models
* ballast is composed of antimony-hardened lead weights individually riveted to hem
* float fasteners are stainless steel bolts
* high tensile strength of fabric is easily capable of sustaining expected loads

Connection System

* Slickhitch extruded aluminum connectors slide quickly and easily together; ASTM has considered this type of connector as a standard
* locking pins secure connections; no tools are required
* prolonged exposure to higher sea states may result in disengagement; this occurrence is unlikely under most circumstances of expected use
* connectors are fastened over entire height of boom to distribute loading evenly

Ease of Use

* booms are relatively compactible in spite of floats so that transportation and storage needs in this regard should not usually be of concern
* the molded flotation with its sloping edges should allow snag-free use
* booms are of light-to-moderate weight; mechanical assistance may be necessary
* booms are easily cleaned, maintained and repaired

Design Features

* high-strength, durable fabric is an outstanding feature of Slickbar booms
* boom material plus type of flotation system results in a containment barrier that can be considered for emergency, semi-permanent or long-term usage
* comprehensive attention to detail includes handholds (continuous lip on floats), anchor points, shape of flotation and stainless fastenings
* a wide variety of sizes and weights of booms are available in addition to the standard models described under Physical Specifications

Swed Sorb International
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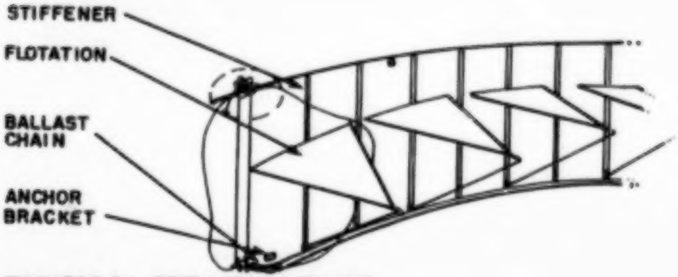
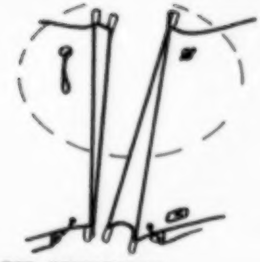
681 00 Kristinehamn, Sweden
telephone 0550 836 32
telex 66391 a/b SWSORB-S

OIL EATER

price upon request




ROD CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions

overall height	78.0 cm
freeboard	31.0 cm
draught	47.0 cm
section length	25 m
shipping volume	0.16 m^3

Weight

per section	67.5 kg
per unit length	2.7 kg/m

Fabric - orange, PVC-coated polyamide

tensile strength	unspecified
tear strength	unspecified
cold crack temperature	-30°C
weight	unspecified

Connector -	overlapping rods with straps and snap hooks

Ballast/Lower Tension Member - chain, size unspecified; ultimate strength = 5500 kg

Top Tension Member -	enclosed polypropylene rope

Flotation - triangular outrigger elements (62/25 m section)

material type	unspecified
buoyancy: weight ratio	unspecified
special features	fold downward for storage

Vertical Stiffeners -	3 per flotation pair (93 per section)
Anchor Points -	1 m from section ends
Handholds -	unspecified

OPERATIONAL DATA

Application

- semi-protected bodies of water including lakes, harbours and rivers
- applicable in up to sea state 1-2
- consider primarily for deployment in stationary mode for work periods of several days to one-to-two weeks; boom should deflect oil in currents of up to about 0.75 knot (1.4 km/h)

Oil Containment

- tension members top and bottom plus outrigger floats and stiffeners should render boom stable; submerging, planing and skirt deflection should not occur
- floats spaced less than one metre apart should allow boom to conform to waves
- freeboard and draught are of adequate size to prevent splashover and drainage under use; some oil losses may occur in short-period, breaking waves

Strength and Durability

- PVC/polyamide fabric is lightweight but resists abrasion as well as has adequate anti-puncture and -tear qualities; avoid prolonged exposure to sunlight
- triangular floats utilize attachment points to the boom at each of the three corners; these should be routinely checked once the boom has been deployed, particularly the line holding the apex furthest from the boom
- ballast chain and top tension line add to the overall strength of the boom
- three vertical stiffeners assist in securing the floats to the boom; these also should add to the boom's durability

Connection System

- the "unisex" couplers slide easily and quickly together as rods overlap, elastic straps hold the rods, and snap hooks interconnect tension members
- no tools are required to effect connection; on-land preconnection is suggested
- the connector is not likely to be compatible with other connection systems; however, a clamp can be purchased for joining other booms together with the Oil Eater
- disengagement of boom sections may occur during prolonged exposure to higher sea states (several days in sea state 3); with breaking waves or tidal currents of about 1 knot (1.8 km/h) or greater continuously stressing the elastic straps, rods and points of attachment of the snap hooks

Ease of Use

- the boom is highly compactible which minimizes storage needs
- the boom's light weight and folding floats facilitate handling; no mechanical assistance should be necessary for launching and retrieval
- the line attaching the apex of each flotation element may be prone to snagging; otherwise stiffeners and tension members are fully enclosed within the boom fabric
- cleaning, maintenance and field repairs should be readily accomplished

Design Features

- the fabric is suitable for a nearshore containment barrier; it has reuse potential
- specific anchor points, brackets for warning lights, sets of internal stiffeners and unique connection and flotation systems are positive aspects of the boom
- the top tension line and high-strength bottom ballast chain are both important to boom stability in low-current deployment situations
- overall boom design is well conceived for a product intended for emergency use; long-term durability of connectors and flotation are unknown factors

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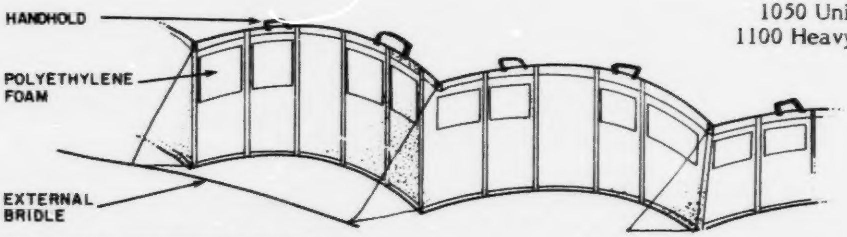
Protective Products Division
P.O. Box 501
S-231 01 Trelleborg, Sweden
telephone (46)0410 51000
telex 32948 a/b TRELLE S

TROILBOOM MODELS 750 & 1050

price (point of manufacture
SEK/m effective 1-1-84)

750 Bantam	270
1050 Universal	810
1100 Heavy Duty	435



PHYSICAL SPECIFICATIONS

Dimensions	Bantam 750	Universal 1050
overall height	75 cm	105 cm
freeboard	25 cm	40 cm
draught	47 cm	65 cm
section length	12 m	12 m
storage volume	0.43 m^3	0.75 m^3
Weight		
per section	61.8 kg	66.5 kg
per unit length	5.15 kg/m	5.54 kg/m

Fabric (all models) - International Orange, PVC/nitrile rubber-coated polyamide

tensile strength	50 kg/cm
tear strength	15 kg
cold crack temperature	-30°C
weight	500 g/m^2

Flotation (all models) - 15 rectangular fabric-enclosed 30-mm foam blocks per section

material composition	polystyrene plastic foam
buoyancy: weight ratio	unspecified

Connector - glass-fibre with screw joints

Ballast - 15-3.25 kg painted cast iron weights per section

Tension Member - external line held by pairs of bridles every 3.5 m section at waterline

size	16 mm	24 mm	24 mm
material type	polypropylene	prolypropylene	polypropylene
ultimate tensile strength	3500 kg	4200 kg	7600 kg

Anchor Points - tension line or bridle fastenings can be used

Handholds - every metre, top and bottom

Vertical Stiffeners - glass fibre reinforced polyester

Other Data - 50 mm Terylene bands reinforced fabric

OPERATIONAL DATA

Application

- 750 - harbours and other semi-protected waters; 1100 - more exposed locations
- 75 applicable in up to sea state 1-2; 1050 - applicable in up to sea state 2-3
- consider for stationary deployment of several days for several weeks; can also be towed or used in currents of about 1 knot (1.8 km/h) or less

Oil Containment

- bridle system attaches through central line to top and bottom of boom resulting in stability during towing operations
- flotation plus bridle should prevent submerging, planing and skirt deflection
- wave conformity should be good with performance tending to deteriorate in short, breaking waves which may result in some oil loss
- freeboard and draught are generally adequate to stop splashover and drainage

Strength and Durability

- Nitrile/PVC-coated polyamide fabric has good strength characteristics and should resist puncture, abrasion and tearing; light weight and oil resistant
- sealed fabric junctures should not disengage
- Terylene reinforcement bands add to booms' overall strength
- high tensile strength member assumes significant portion of loading
- polystyrene foam is highly resistant to impact from most forms of debris

Connection System

- glass fibre reinforced battens screwed together
- precautions are advised to ensure external bridle does not become entangled
- connectors should be suitable for long-term use; compatibility with other systems is possible with adaptor

Ease of Use

- booms are lightweight, compactible; transportation, storage are facilitated
- the flat, smooth-sided construction also contributes to handling ease
- external bridle system may snag or tangle unless due attention is paid to it
- booms easily cleaned field repaired (with advice of manufacturer); oiled tension lines are more difficult to restore to prespill condition

Design Features

- boom design reflects continuous upgrading of a product based on field testing
- outstanding features include lightweight material and Terylene band reinforcement
- location and strength of bridle suit operation of boom in currents
- details include handholds, internal flotation, unique overlapping section ends
- several reuses should be possible if boom is carefully handled

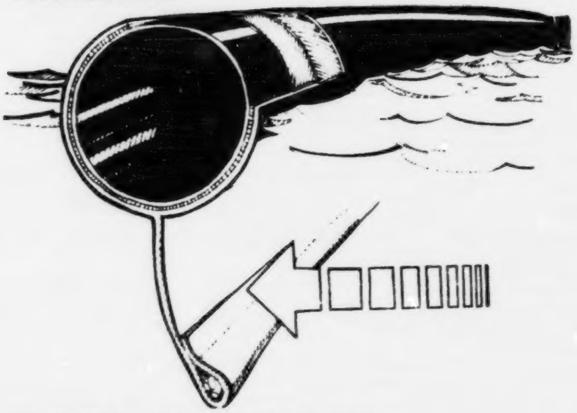
ADDITIONAL INFORMATION

1. A Winter Evaluation of Oil Skimmers and Booms, Environment Canada, Ottawa, Ontario (September, 1981) (in preparation).

2. Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing 1974-1979, EPA-600/9-81-007, US Environmental Protection Agency, Cincinnati, Ohio (January, 1981).

3. D. Cormack, Oil Recovery System for Open Sea Use: The Springsweep System, Warren Spring Laboratory, Stevenage, UK (undated).

TRELLBOOM



price quoted (point of manufacture
SEK/m effective January, 1984)

Trellboom Sea Boom 1360:--
Trellboom Ocean Boom 1900:--

PHYSICAL SPECIFICATIONS

Dimensions	Trellboom Sea Boom	Trellboom Ocean Boom
overall height	85 cm	180 cm
freeboard/hull	35 (diameter) cm	60 (diameter) cm
draught	50 cm	120 cm
section length	13.3 m	10 m
Weight		
per section	140 kg	205 kg
per unit length	10.5 kg/m	20.5 kg/m

Fabric - black, Chloroprene rubber with reinforced polyester cord

goods thickness in hull	3.2 mm
goods thickness in tongue	1.5 mm
cold crack temperature	-20°C
weight (g/m^2)	600 g/m^2

Connector - saltwater resistant stainless steel

Ballast - galvanized chain

Anchor Points - by every stainless steel connector

Lifting Point - by every stainless steel connector

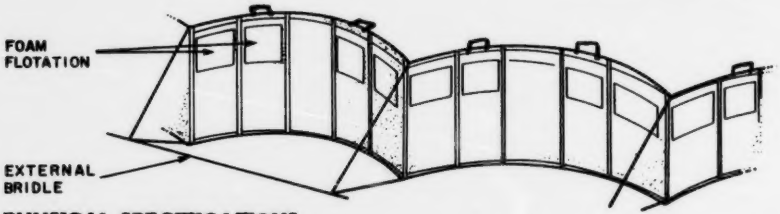
Other Data - Trellboom is an inflatable boom and made up in sections each section is individually filled with air during lay out; each section is furnished with two air valves; easy to handle due to hydro driven deploy drum with separate power unit

TROILBOOM GIANT 1500
Troilboom Giant Sweeping Unit

(Trelleborg/AB)

price quoted (point manufacture
SEK/m effective January, 1984)

Troilboom Giant 1.090:--
Troilboom Sweeping Unit 163.000:--



PHYSICAL SPECIFICATIONS

Dimensions	Troilboom Giant 1500	Troilboom Giant Sweeping Unit
overall height	150 cm	150 cm
freeboard	50 cm	50 cm
draught	100 cm	100 cm
section length	14.4 m (in standards units of 57.6 m)	delivered in standard units one oil collection bag with 2 pcs of 57.6 m guide wings and tow lines
storage volume (m^3)	1.5	13
Weight		
per section	111 kg	-
per unit length (kg/m)	7.7 kg/m	7.7 kg/m

Fabric - orange, PVC/Nitrile rubber-coated polyamide

tensile strength	50 kg/cm
tear strength	15 kg
cold crack temperature	-30°C
weight	500 g/m^2

Flotation - 18 rectangular foam blocks per section; enclosed within fabric polystyrene plastic foam

Connector - glass fibre with stainless steel screw joints

Ballast - 18 pcs of 3.25 kg painted cast iron weights per section

Tension Member - external line (load-relieving line) diameter 40 mm with tensile strength of 20.000 kg located at water line and held by pairs of stay line diameter 10 mm for every 2.11 metre of boom (all lines of threestranded polypropylene)

Anchor Points - by load-relieving line or stayline fastenings

Handholds - at top and bottom

Vertical Stiffeners - support and spreader battens of glass fibre reinforced polyester

Other Data - fabric is reinforced with 5 pcs, 50-mm polyester strips (each with tensile strength of 1800 kg); standard knit of 57.6 metre Troilboom Giant is delivered in steel frame container 1.6 x 2.2 x 1.73 m (585 kg) standard unit of 1 pce complete Troilboom Giant Sweeping Unit delivered in a soft floating fabric container on an aluminum frame container (980 kg)

OPERATIONAL DATA

Application

* offshore use and other more exposed locations, applicable to sea state 2-3
* for sweeping or use in relative currents and stationary containment; working periods of several days to several weeks should be possible
* can be changed into sweeping units with special pocket

Oil Containment

* bridle should stabilize boom in sweeping operations
* tension line plus flotation prevent submerging, planing and skirt deflection
* rectangular flotation should allow good wave conformity; higher sea states (3) may result in oil overtopping the boom as breaking waves impinge upon it
* freeboard and draught should generally resist splashover and drainage

Strength and Durability

* Nitrile/PVC-coated polyamide material should resist weathering, puncture, abrasion and tearing; prolonged exposure to sunlight could affect fabric
* sealed junctures should not disengage
* Terylene band reinforcement adds to overall strength qualities
* high strength Kevlar line should assume significant portion of loading
* closed-cell polyethylene foam flotation highly durable, resists debris impact

Connection System

* U-bolt connector is quick and easy to use; glass fibre reinforced battens screwed together
* overlapping section ends are secured by Terylene bands
* no tools required; wing nuts should be wired to prevent them from backing off
* connectors are compatible with other systems through use of an adaptor

Ease of Use

* boom is highly compactible for storage and transportation purposes
* booms are moderately heavy; mechanical aids are suggested for retrieval
* although the boom proper has smooth sides, the external bridle system requires attention so that it does not tangle or snag during launching and retrieval
* field repairs can be readily accomplished upon the advice of the manufacturer; cleaning should be similarly done with ease except for oiled tension lines

Design Features

* advanced boom design reflects continuous engineering by manufacturer
* compactability, Terylene bands, lightweight fabric are outstanding features
* bridle system and tension line accommodate sweeping operations
* construction details include lifting handles, internal foam flotation, Kevlar lines and cast iron ballast weights painted with an anti-corrosive
* reuse is possible if boom is carefully handled

ADDITIONAL INFORMATION

1. A Winter Evaluation of Oil Skimmers and Booms, Environment Canada, Ottawa, Ontario (September, 1981) (in preparation)

2. Smith, G.F. and H.W. Lichte, Summary of US Environmental Protection Agency's OHMSETT Testing 1974-1979, EPS-600/9-81-007, US Environmental Protection Agency, Cincinnati, Ohio (January, 1981).

3. D. Cormack, Oil Recovery System for Open Sea Use the Springsweep System, Warren Spring Laboratory, Stevenage, UK (undated).

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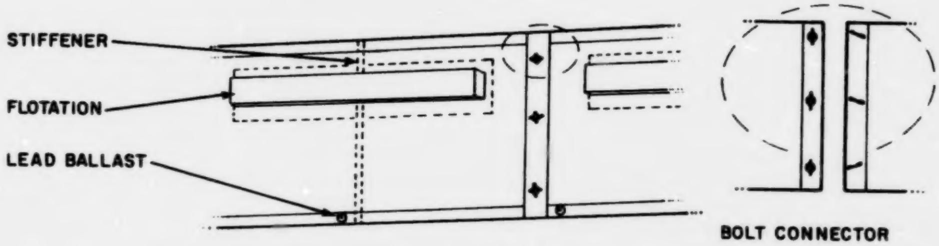
18" BOOM Mini-Boom & Hi-Performance

price for Mini boom only
(point of manufacture
$US/ft effective 1-15-83)
$19.25



PHYSICAL SPECIFICATIONS (both models - exceptions noted where applicable)

Dimensions		
overall height	45.72 cm	
freeboard	15.24 cm	
draught	30.48 cm	
section length	12.19 m	
shipping volume	Mini 0.44 m^3	HP 0.62 m^3

Weight		
per section	Mini 27.2 kg	HP 36.3 kg
per unit length	Mini 2.2 kg/m	HP 3.0 kg/m

Fabric - yellow, nylon coated with Paracil-Ozo fabric

tensile strength	89.4 kg/cm
tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified

Flotation - rectangular, closed-cell Ensolite foam

size	Mini 68.58 x 10.16 x 3.49 cm HP-unspecified
buoyancy: weight ratio	2:1
special features	in vulcanized pockets supported by steel strips

Connector - bronze bolts, plate, nuts and toggle arrange-ment; Quickconnect optional

Ballast -	lead weights (Mini 0.86 kg/m) (HP-unspecified)
Tension Members -	none
Vertical Stiffeners -	elastomer-coated steel strips every 1.067 m
Anchor Points -	none
Handholds -	none

OPERATIONAL DATA

Application

- harbours, bays and other protected bodies of water; up to sea state 1
- consider for stationary deployment in relatively calm water where prolonged containment procedures may be required (periods exceeding several weeks) and debris infestations occur

Oil Containment

- rectangular flotation elements coupled with vertical stiffeners should enable boom to assume a full upright position
- submerging, planing and skirt deflection should not be problems since boom should be deployed in calm or low current (0.5 knot (0.9 km/h) or less) situations
- adequate wave conformance should be exhibited in conditions up to sea state 1
- freeboard and draught are of adequate size to prevent splashover and drainage under indicated conditions of use

Strength and Durability

- coated nylon fabric resists weathering, puncture, abrasion and tearing
- all fabric seams are heat-sealed so that their disjuncture is unlikely
- steel stiffeners enclosed in vulcanized pockets add to boom's durability; flotation is also fully encased in a similar manner
- Ensolite flotation should resist impact from debris
- tensile strength of fabric is relatively high

Connection System

- Bolt-and-toggle system is quick and easy to use; direct material-to material fitting is made; spring steel plate is enclosed at section ends
- method of connection should distribute load over entire height of boom
- long-term exposure of the connections during deployment operations should be possible if higher currents are avoided

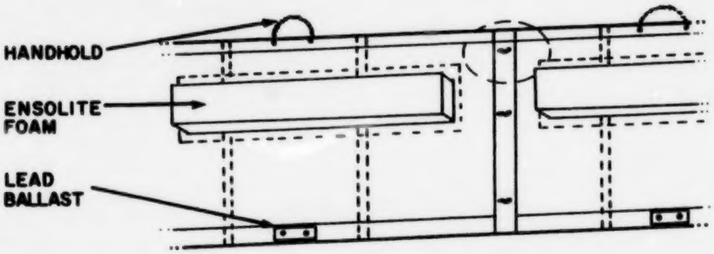
Ease of Use

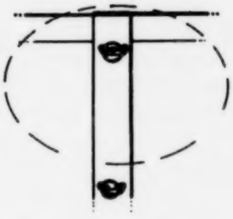
- boom is compactible and should present no storage/transportation concerns in this regard
- section weight is relatively light and no mechanical assistance should be necessary when handling the boom
- all components except the lead ballast weights are fully enclosed within the fabric; the flat, smooth sides should prevent snagging
- cleaning and field repair of the boom should be readily accomplished
- several reuses should be possible

Design Features

- vulcanized fabric seams and unique materials combine to produce a durable boom
- simplicity of design plus relatively light sections allow quick handling
- tow plates are available for the boom
- the Paracil-Ozo coating provides excellent weathering- and -abrasion-resistance
- Ensolite foam flotation should be highly durable

36" BOOM Standard, Outer Harbor & Two-Ply (Uniroyal Inc.) price upon request





BOLT CONNECTOR

PHYSICAL SPECIFICATIONS (all models except as noted)

Dimensions

overall height	91.5 cm		
freeboard	30.5 cm		
draught	61.0 cm		
section length	12.2 m		
shipping volume	(S) 0.78 m^3	(OH) 1.13 m^3	(TP) 1.56 m^3

Weight

per section	(S) 54.4 kg	(OH) 63.5 kg	(TP) 105.2 kg
per unit length	(S) 4.5 kg/m	(OH) 5.2 kg/m	(TP) 8.6 kg/m

Fabric - yellow, nylon coated with Paracil - Ozo fabric

tensile strength	(S) and (OH) 109 kg/cm	(TP) 214 kg/cm
tear strength	unspecified	
cold crack temperature	unspecified	
weight	unspecified	

Flotation - rectangular size unspecified, closed-cell Ensolite foam

buoyancy: weight ratio	unspecified
special features	enclosed in vulcanized pockets and supported by steel strips

Connector - bronze bolts, plate, nuts and toggle arrangement; Quickconnect optional

Ballast -	lead weights, unspecified
Tension Members	none

Vertical Stiffeners - elastomer-coated steel strips, spacing unspecified

Anchor Points -	none
Handholds -	polypropylene rope, spacing unspecified

OPERATIONAL DATA

Application

* harbours, semi-protected bodies of water and other general nearshore usage
* applicable in up to sea state 2; useful in debris infestations
* consider for stationary containment for work periods several weeks or more; use in low currents (less than 0.5 to 1 knot (0.9 to 1.8 km/h)) should also be possible

Oil Containment

* flotation plus stiffeners should enable boom to assume a full upright position
* boom should be used in non-flowing or low current situations; system of floats should provide adequate resistance to submerging, planing and skirt deflection
* wave conformance characteristics should be adequate up to sea state 2
* freeboard and draught are sized appropriately to prevent splashover and drainage

Strength and Durability

* coated nylon fabric is highly resistant to weathering, puncture, abrasion and tearing; this particularly applies to the Two-Ply Boom
* all fabric seams are thermally sealed so that disjuncture is not likely
* tensile strength relatively high and adequate to assume loads acting on boom
* vulcanized construction plus steel vertical stiffeners add to overall strength qualities
* closed-cell Ensolite should resist impact from debris

Connection System

* belt-and-toggle arrangement is quick and easy to use; direct material-to-material fitting is made; spring steel plate is enclosed at section ends
* method of connection should distribute load over entire height of boom
* long-term exposure of the connections during deployment operations should be possible if higher currents are avoided

Ease of Use

* Standard model is relatively compactible; others are moderately, so and storage and transportation needs should be preplanned
* Standard and Outer Harbor Booms are moderately heavy and mechanical assistance may be required; Two-Ply Boom requires lifting power for handling
* all booms feature smooth-sided construction which should prevent snagging and facilitate launching and recovery
* booms are easily cleaned and should be field-repairable
* at least several reuses of all booms should be possible

Design Features

* construction detail include handholds, double steel stiffeners at flotation and simple lead ballast weights
* foam flotation and stiffeners are fully enclosed within vulcanized pockets
* Paracil-Ozo/nylon fabric is highly durable with anti-weathering properties
* the Ensolite foam is an appropriate choice of flotation
* overall design is non-complex and highly suitable for a fast response emergency boom

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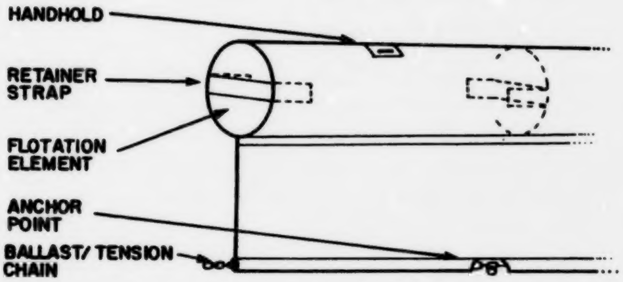
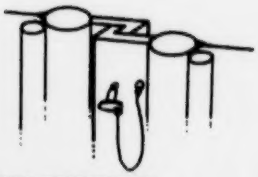
telephone (604)929-5451
telex 043-52686 a/b VERSTECH VCR

GENERAL PURPOSE BOOM (Bennett Boom) price upon request





PHYSICAL SPECIFICATIONS

Dimensions	Model 7/11	Model 12/18
overall height	44.2 cm	75.2 cm
freeboard	15.2 cm	25.4 cm
draught	29.0 cm	49.8 cm
section length	15.2 m	15.2 m
storage volume	0.71 m^3	1.4 m^3
Weight		
per section	36.2 kg	54.3 kg
per unit length	2.4 kg/m	3.6 kg/m

Fabric - Signal Yellow, vinyl-coated polyester Shelterite 4024

tensile strength	170 kg/cm
tear strength	86 kg
cold crack temperature	-40°C
weight	820 g/m^2

Flotation - cylindrical segments of polyethylene foam

	Model 7/11	Model 12/18
buoyancy: weight ratio	7.9:1	15.3:1

Connector - proposed ASTM connector, extruded aluminum

Ballast/Lower Tension Member - 6.35 mm galvanized chain in both models breaking strength = 2268 kg

Top Tension Member - none

Handholds (spacing) - 3 m

Anchor Points (spacing) - 7.6 m

OPERATIONAL DATA

Application

* semi-protected waters and other nearshore applications; smaller models (7/11) intended for nearshore use and larger booms (12/18) designed for more exposed conditions
* generally applicable in up to sea states 1-2
* consider primarily for stationary containment for several days to several weeks; angled deflection of oil in low currents (1 knot (1.8 km/h) or less) should also be possible

Oil Containment

* cylindrical flotation element plus bottom tension chain render booms highly stable; very good resistance to submerging, planing and skirt deflection
* flotation also allows very good wave conformity
* freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

* vinyl-coated polyester is highly resistant to weathering, puncture, abrasion and tearing
* thermally-sealed fabric junctures should not disengage if boom is maltreated
* galvanized chain adds significantly to overall strength if it assumes loading
* polyethylene foam flexible and durable; should withstand impact from debris

Connection System

* connectors easily and quickly join with no female/male distinction
* locking pins secure connections; no tools are required since tension chain is preshackled to connector; in-water interconnection should usually be possible
* under normal conditions, disjuncture of connector is unlikely; prolonged exposure to higher sea states (in excess of 3) may result in disconnection

Ease of Use

* small models (7/11) are relatively compactible; larger booms (12/18) are not so that storage and transportation needs in this regard should be considered
* booms are relatively lightweight; mechanical aids should not be needed
* both chain and flotation are fully enclosed within fabric; the smooth-sided boom is therefore easily deployed and retrieved without snagging
* boom fabric and design simplicity allows quick cleaning and field repair
* several reuses of the booms should be possible

Design Features

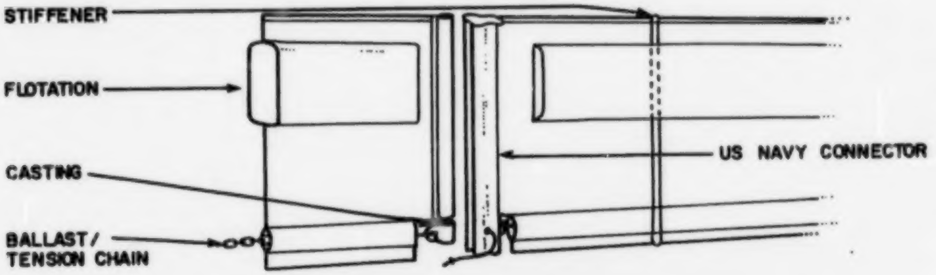
* reserve buoyancy booms is very high, particularly for a solid foam barrier
* cylindrical flotation plus bottom tension chain should permit angled deflection of oil in currents if chain maintains boom in full upright position
* optional boom fabrics are oil- and chemical-resistant and of higher durability
* double fabric pocket is used for tension chain
* all metals used in connectors, fastenings and tension member are corrosion-resistant

ADDITIONAL INFORMATION

1. Evaluation of the General Purpose Boom was undertaken in the St. Clair River in May 1980 by the Petroleum Industry Marine Environmental Co-operative (Ontario).

2. PROSCARAC, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

INSHORE BOOM Models 18 and 36 (Bennett Boom) price upon request
(Versatech Products Inc.)



PHYSICAL SPECIFICATIONS

Dimensions	Model 18	Model 36
(also available as Models 12 & 24 - overall height in inches)		
overall height	43.7 cm	89.4 cm
freeboard	15.2 cm	30.5 cm
draught	28.5 cm	58.9 cm
section length	15.2 m	15.2 m
storage volume	0.35 m^3	0.71 m^3
Weight		
per section	33.9 kg	49.8 kg
per unit length	2.2 kg/m	3.3 kg/m

Fabric - Signal Yellow, vinyl-coated polyester Shelterite 4024

tensile stength	170 kg/cm
tear strength	86 kg
cold crack temperature	-40°C
weight	820 g/m^2

Flotation - rectangular foam segments enclosed within fabric

buoyancy: weight ratio	3.1:1	2.0:1

Connector - US Navy or Bennett, extruded aluminum

Ballast/Lower Tension Member - 6.35 mm galvanized chain in all models; breaking strength = 2268 kg

Handholds (spacing) - 3 m

Anchor Points (spacing) - 7.6 m

OPERATIONAL DATA

Application

* designed for sheltered waters; smaller models (12 and 18) suitable for inner harbours and larger booms (24 and 36) applicable to more exposed conditions
* generally applicable to sea state 1; larger booms applicable to sea state 1-2
* for stationary containment for work periods of several days to several weeks

Oil Containment

* flotation plus bottom chain should enable boom to assume full upright position
* submerging, planing and skirt deflection should not be problems since operations should be restricted to calm water or very low currents (less than 0.25 knot (0.1 km/h))
* rectangular flotation suits low wave conditions below sea state 2
* freeboard and draught are sized appropriately to prevent splashover and drainage

Strength and Durability

* vinyl/polyester Shelterite resists weathering, puncture, abrasion and tearing
* all fabric junctures are thermally welded, therefore, not prone to disjuncture
* galvanized chain adds significantly to overall strength if it assumes loading
* foam flotation is flexible and durable and should withstand impact from debris

Connection System

* Bennett-type connector slides easily over thickened section ends
* preshackled tension chain slots into connectors; no tools are required
* disjuncture of connectors unlikely upon prolonged exposure to higher seas
* connection to several other systems should be possible

Ease of Use

* all models are compactible; storage and transportation needs are minimized
* boom relatively lightweight; mechanical handling not required
* tension chain and flotation segments are fully enclosed within fabric resulting in a smooth-sided boom that does not snag when launched and retrieved
* boom fabric and simple design allow quick cleaning and field repairs
* several reuses of the boom should be possible

Design Features

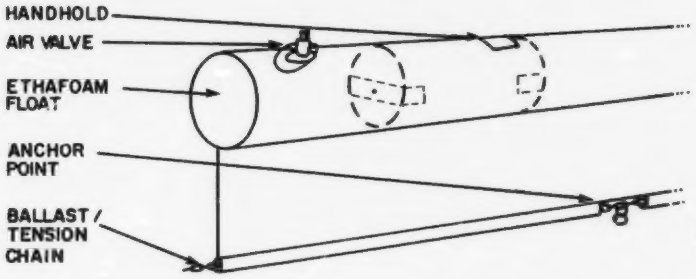
* the boom includes anchor points and handholds
* double fabric pocket is utilized for tension chain
* reserve buoyancy of the boom is adequate for its intended usage
* all metals used in connectors, fastenings and tension members are corrosion-resistant
* optional fabrics are oil-and chemical-resistant as well as of higher durability

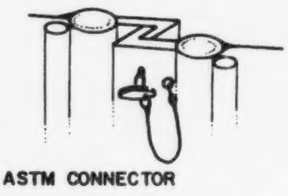
ADDITIONAL INFORMATION

Vanderkooy, N., A. Robertson, and C.J. Beckett, Evaluation of Oil Spill Barriers and Deployment Techniques for the St. Clair-Detroit River System, EPS-4-EC-76-4, Environment Canada, Ottawa, Ontario (March, 1976).

NAV-PAK (Bennett Boom)
(Versatech Products Inc.)

price upon request





PHYSICAL SPECIFICATIONS

Dimensions	Model 7/11	Model 12/18
overall height	44.2 cm	75.2 cm
freeboard	15.2 cm	25.4 cm
draught	29.0 cm	49.8 cm
section length	15.2 m	15.2 m
storage volume	0.43 m^3	0.71 m^3
Weight		
per section	36.2 kg	47.5 kg
per unit length	2.38 kg/m	3.13 kg/m

Fabric - International Orange, vinyl-coated polyester Shelterite 4024

grab tensile strength	170 kg/cm
tear strength	86 kg
cold crack temperature	-40°C
weight	820 g/m^2

Flotation - cylindrical; segments of polyethylene foam are interspersed with self-inflating chambers incorporating one-way check valves

buoyancy: weight ratio	10.0:1	23.3:1

Connector -	proposed ASTM connector, extruded aluminum
Ballast/Lower Tension Member -	6.35 mm galvanized chain in both models; breaking strength = 2268 kg
Top Tension Member -	none
Handholds (spacing) -	3 m
Anchor Points (spacing) -	7.6 m

OPERATIONAL DATA

Application

- harbours, rivers and general nearshore applications
- 7/11 applicable in up to sea state 1-2; 12/18 applicable in up to sea state 2
- consider primarily for stationary containment as well as angled deflection of oil in currents of up to about 1 knot (1.8 km/h); work periods of several days to several weeks should be possible

Oil Containment

- cylindrical flotation plus bottom tension chain render booms very stable; excellent resistance to submerging, planing and skirt deflection under indicated conditions of use
- combination air- and -foam flotation results in high reserve buoyancy and excellent wave conformity
- freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

- vinyl-coated polyester is highly resistant to weathering, puncture, abrasion and tearing
- thermally-sealed fabric seams have low probability of disengagement
- galvanized chain adds significantly to overall strength if it assumes loading
- polyethylene foam supplements air chambers and should prevent boom sinking should puncture occur

Connection System

- connectors have no male/female distinction and join quickly and easily
- in-water interconnection should be possible when boom is not stressed; locking pins secure connections without tools since chain is preshackled to chain
- connector disjuncture is unlikely under reasonable cleanup conditions; prolonged exposure to higher sea states (3-4) might cause disconnection

Ease of Use

- good compactibility minimizes storage/transportation concerns in this regard
- booms are relative lightweight; mechanical lifting aids not usually needed
- smooth-sided boom deploys and retrieves without snagging since chain and flotation are fully enclosed
- boom fabric plus straight-forward design allow quick cleaning and field repairs
- several reuses of the boom should be possible

Design Features

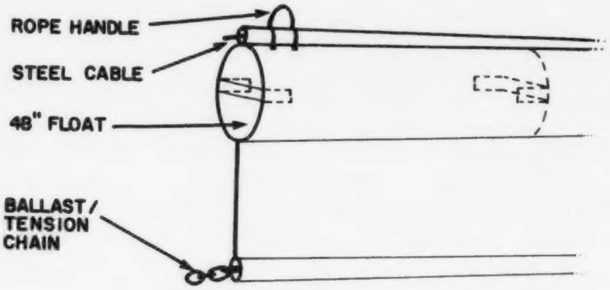
- air-and-solid buoyancy provides excellent wave response and durability
- cylindrical chamber plus chain permits angled deflection of oil in currents
- optional boom fabrics are oil-, chemical-resistant and of higher durability
- double fabric pocket is utilized for ballast/tension chain
- metals used in connectors, fastenings and tension member are corrosion-resistant

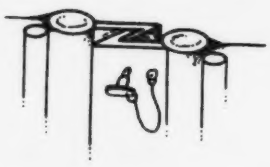
ADDITIONAL INFORMATION

PROSCARAC, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

RIVER BOOM (Bennett Boom)
(Versatech Products Inc.)

price upon request





ASTM CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	Model 6/6	Model 7/11
overall height	34.3 cm	48.3 cm
freeboard	15.2 cm	17.8 cm
draught	19.1 cm	30.5 cm
section length	15.2 m	15.2 m
storage volume	0.64 m^3	0.71 m^3
Weight		
per section	43 kg	52 kg
per unit length	2.8 kg/m	3.4 kg/m

Fabric - International Orange, vinyl-coated polyester Shelterite 4024 fabric

tensile strength	170 kg/cm
tear strength	86 kg
cold crack temperature	-40°C
weight	820 g/m^2

Flotation - cylindrical segments of polyethylene foam

buoyancy: weight ratio	4.4:1	4.6:1

Connector - proposed ASTM connector, extruded aluminum

Ballast/Lower Tension Member - 12.7 mm galvanized chain in both models; breaking strength = 4082 kg

Top Tension Member - 6.35 mm steel cable; breaking strength = 2268 kg

Handholds (spacing) - 3 m

Anchor Points (spacing) - 7.6 m

OPERATIONAL DATA

Application

* rivers and more general inshore applications
* 6/6 applicable in up to sea state 1; 7/11 functions well to sea state 1-2
* consider for both stationary containment and angled deflection of oil in currents of up to 1.5 knots (2.8 km/h); working periods of several days to several weeks should be possible

Oil Containment

* top and bottom tension members plus cylindrical flotation render booms very stable; excellent resistance to submerging, planing and skirt deflection
* foam flotation elements result in very good wave conformity
* freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

* vinyl-coated polyester resistant to weathering, puncture, abrasion and tearing
* thermally-sealed fabric junctures will not likely disengage under most circumstances
* galvanized chain and steel cable provide significant strength by assuming loading
* durable polyethylene foam survives impacts from most forms of debris

Connection System

* connectors have no male/female distinction; they join quickly and easily
* on-land preconnection is required prior to deployment in currents; in-water joining of sections is possible in non-flowing conditions
* locking pin secures connection; no tools are required since preshackled chain slots into connector
* disengagement of connectors is unlikely under indicated conditions of use

Ease of use

* good compactibility minimizes storage/transportation needs in this regard
* booms are relatively lightweight; mechanical should not usually be needed
* smooth-sided booms deploy and recover without snagging since tension members and flotation are fully enclosed
* design simplicity and excellent fabric allow field repairs and quick cleaning
* reuse of the boom should be possible

Design Features

* combination of top cable and bottom chain plus cylindrical flotation suit boom intended for oil deflection in currents
* segmented foam flotation provides good wave conformity
* optional fabrics are oil-, chemical-resistant and of higher durability
* double fabric pocket houses ballast/tension chain
* metals used in connectors, fastenings and tension member are corrosion-resistant

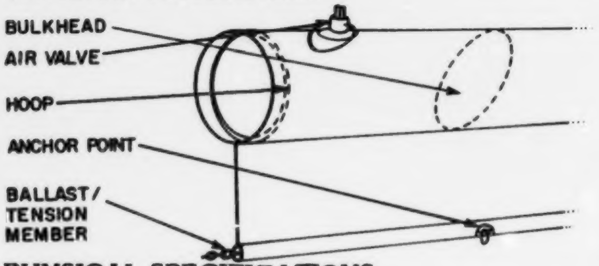
ADDITIONAL INFORMATION

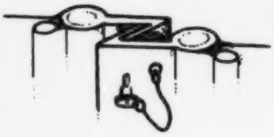
1. In May 1980, evaluation of the River Boom was conducted in the St. Clair River by the Petroleum Industry Marine Environmental Co-operative (Ontario).

2. PROSCARAC, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

ZOOOM BOOM (Bennett Boom)
(Versatech Products Inc.)

price upon request





ASTM CONNECTOR

PHYSICAL SPECIFICATIONS

Dimensions	Model 7/11	Model 12/18	Model 18/18
overall height	44.2 cm	75.2 cm	89.7 cm
freeboard	15.2 cm	25.4 cm	38.1 cm
draught	29.0 cm	49.8 cm	51.6 cm
section length	30.5 m	30.5 m	30.5 m
storage volume	0.17 m^3	0.51 m^3	0.99 m^3
Weight			
per section	63.5 kg	90.8 kg	177 kg
per unit length	2.1 kg/m	3 kg/m	5.8 kg/m

Fabric - International Orange, PVC-coated polyester Shelterite 4024

tensile strength	170 kg/cm
tear strength	86 kg
cold crack temperature	-40°C
weight	820 g/m^2

Flotation -	cylindrical air chamber in all models		
diameter	17.8 cm	30.5 cm	45.7 cm
type	self-way check valves		
buoyancy: weight ratio	12.0:1	24.0:1	28.0:1

Connector -	proposed ASTM connector, extruded aluminum
Ballast/Lower Tension Member -	6.35 mm galvanized chain in all models; breaking strength = 2268 kg
Top Tension Member -	none
Vertical Stiffeners -	none
Handholds (spacing) -	unspecified
Anchor Points (spacing) -	10.2 m, fail-safe mechanism included

OPERATIONAL DATA

Application

- quick response for applications ranging from inland waters to harbours and more exposed locations, depending upon size
- 7/11 applicable to sea state 1-2; 12/18 suitable to sea state 2; 18/18 functional to sea state 2-3
- consider primarily for stationary containment as well as for angled deflection of oil in currents of up to about 1 knot; working periods of several days to one week should be considered

Oil Containment

- cylindrical air chamber plus bottom tension chain should render boom stable; testing has shown the length of the chain is critical to optimizing containment
- with correct chain length, resistance to planing and skirt deflection should be good
- air chamber results in excellent wave conformity with submerging unlikely
- freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

- vinyl-coated polyester is highly resistant to weathering, puncture, abrasion and tearing
- thermally-sealed fabric seams should not disengage when stressed
- galvanized chain contributes significantly to overall strength if it assumes loading
- bulkheads divide air chamber into 2-m sections in case of puncture

Connection System

- connectors have no male/female distinction and join quickly and easily
- in-water connection is possible when boom is not stressed; locking pins secure connections, tools are not required for preshackled tension chain
- disjuncture of connectors is unlikely under reasonable cleanup conditions; prolonged exposure to higher sea states (3-4) might cause disconnection

Ease of Use

- high compactibility minimizes storage/transportation needs
- 7/11 is lightweight; other models may require mechanical means for launching/retrieval depending upon specific circumstances
- smooth-sided boom deploys and retrieves without snagging
- boom self-inflates through one-way check valves; no air compressor is required
- several reuses of the boom should be possible

Design Features

- air valves allow rapid deployment; air chambers provide excellent wave response
- boom will not sink when uninflated in water
- valves are removed but remain attached via lanyards upon retrieval
- anchor points incorporate a fail-safe mechanism to prevent damage to fabric
- compartmentalized buoyancy chamber enchances survival potential in the event of puncture

ADDITIONAL INFORMATION

1. Borst, M. and R.A. Griffiths, Quantified Performance Testing of the Zoom Boom, EE-23, Environment Canada, Ottawa, Ontario, undated. The report describes tests conducted at OHMSETT (November, 1980).

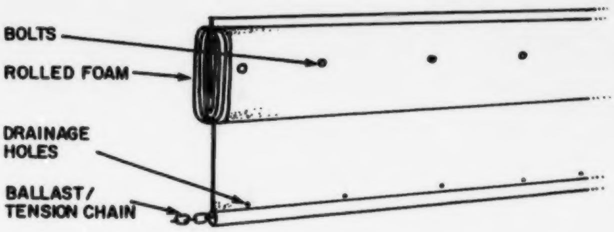
2. A Winter Evaluation of Oil Skimmers and Booms, Environment Canada, Ottawa, Ontario (September, 1981) (unpublished).

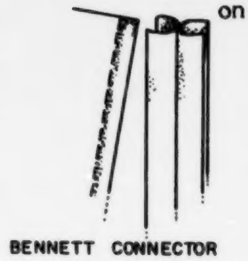
3. PROSCARAC, Oil Spill Containment Boom Evaluation Trials - North Saskatchewan River, Canadian Petroleum Association (August, 1980).

EL CHEAPO Semi-Disposable Boom
(Versatech Products Inc.)

price (point of manufacture
$Cnd/ft effective 11-6-81)

$4.40 to $9.90 depending
on type and amount





PHYSICAL SPECIFICATIONS (El Cheapo Segundo 6/13 model only)

Dimensions	
overall height	48 cm
freeboard	15 cm
draught	33 cm
section length	30.5 cm
shipping volume	0.6 m^3
Weight	
per section	55 kg
per unit length	1.8

Fabric - Signal Yellow, vinyl-coated polyester Shelterite 3214

grab tensile strenth	136/113 kg
tear strength	45/41 kg
cold crack temperature	-40°C
weight	435 g/m^2

Flotation - rectangular, double Ethafoam sheet wrapped around Ethafoam core

dimensions	0.6 x 76 x 137 cm sheet, 12 x 15 x 137 cm core
buoyancy: weight ratio	2.6:1
Connector -	US Navy (Bennett), extruded aluminum
Ballast/Lower Tension Member -	6 mm steel chain
ultimate strength	2140 kg
weight	1.04 kg/m
Top Tension Member -	none
Handholds -	none
Vertical Stiffeners -	none
Anchor Points (spacing) -	15.2 m

Other Data - available in three models: Premier (610 g/m^2 fabric), Segundo (443 fabric) and Cheapo (339 fabric); each comes in three sizes 4/9 (33 cm), 6/13 (48 cm) and 6/19 (64 cm)

OPERATIONAL DATA

Application

* emergency use in protected waters and more general nearshore applications
* applicable in sea states ranging from 1 to 1-2 depending on size
* consider for stationary containment of oil for work periods of several days to one week

Oil Containment

* foam flotation plus bottom chain enable boom to assume a full upright position
* submerging, planing and skirt deflection should not be problems if use is restricted to no- or low-flow conditions (less than 0.25 knot (0.5 km/h)); ensure chain is of correct length to assume loading; otherwise leaning results
* rectangular flotation generally best applies to low wave conditions (maximum sea state 1 or slightly higher)
* freeboard and draught prevent splashover and drainage under indicated conditions of use

Strength and Durability

* despite semi-disposable label, fabric resists weathering, puncture, abrasion and tearing; reuse should be possible
* fabric is heat-sealed except for El Cheapo which is stitched
* steel chain adds to overall strength qualities; it is galvanized in Premier and black in Segundo and Cheapo
* foam flotation is flexible and durable and should withstand impact from debris
* double fabric pocket houses tension chain

Connection System

* Bennett (US Navy) connector slides easily over thickened section ends
* preshackled tension chain slots into connectors; no tools are required
* disjuncture of connectors is unlikely upon prolonged exposure to higher seas
* connection to other connector systems should be possible

Ease of Use

* all models are compactible; storage and transportation needs are minimized
* booms are lightweight and require no mechanical aids for handling
* smooth-sided boom encloses flotation and chain; deployment and retrieval are snag-free
* fabric and simple design allow quick cleaning and field repairs

Design Feature

* unique flotation units of wrapped Ethafoam core are highly durable; stainless bolts ensure their position is maintained within pockets
* 6 mm chain is used in Premier and Segundo models; 5 mm chain is used in Cheapo
* connector in Cheapo model is PVC; other booms utilize aluminum units
* reserve buoyancy is adequate for intended usage
* booms should be considered lower costs alternative to other standard inshore barriers

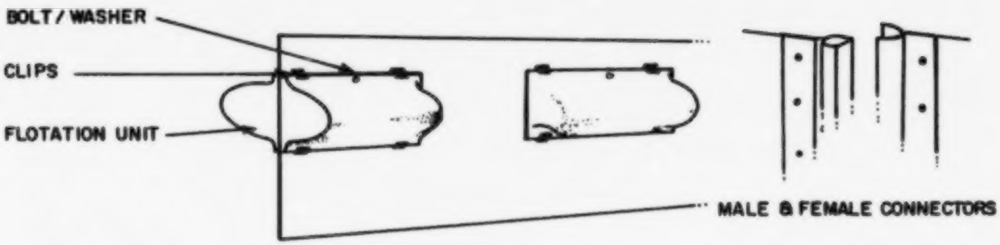
ADDITIONAL INFORMATION

Solsberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

PERMANENT HARBOUR BOOM Models 18 & 30 (Bennett Boom)

price upon request

(Versatech Products Inc.)



PHYSICAL SPECIFICATIONS

Dimensions	Model 18	Model 30
(also available as Models 15, 24 and 36 - overall height in inches)		
overall height	45.7 cm	76.2 cm
freeboard	20.3 cm	30.5 cm
draught	25.4 cm	45.7 cm
section length	15.2 m	15.2 m
storage volume	1.36 m^3	1.61 m^3
Weight		
per section	152 kg	201 kg
per unit length	10 kg/m	13.2 kg/m

Fabric - black, vinyl-coated woven polyester belting, anti-fouling impregnated

tensile strength	200 kg/cm
tear strength	unspecified
cold crack temperature	unspecified
weight	unspecified

Flotation - flat, ovular, rotary-molded polyurethane floats

buoyancy: weight ratio	3.6:1	3.3:1
special features	floats are detachable; each is held by two clips and one bolt	

Connector -	US Navy, extruded aluminum
Tension Members -	none
Ballast -	none
Handholds (spacing) -	3 m
Anchor Points (spacing) -	7.6 m

OPERATIONAL DATA

Application

* permanent installation at terminal or other port facility
* generally applicable in sea states ranging up to 1-2 depending upon model
* consider for long-term stationary deployment where continuous in-water placement is necessary; deflection of oil in low currents (less than 0.5 knot (0.9 km/h)) should also be possible

Oil Containment

* outrigger-style floats plus heavy fabric render boom stable; good resistance to submerging, planing and skirt deflection under indicated conditions of use
* segmented flotation with adequate reserve buoyancy should also result in good wave conformance
* freeboard and draught are of adequate size to prevent splashover and drainage

Strength and Durability

* vinyl/polyester belting has high resistance to weathering, puncture, abrasion and tearing
* skirt is impregnated with anti-fouling compound
* polyurethane-filled polyethylene floats withstand impacts from debris and abrasion
* floats attach via central bolts and end clips accommodating differential stretching of fabric and float

Connection System

* US Navy connectors join quickly and easily
* in-water connection should usually be possible in spite of boom's high weight
* locking pin secures connection; no tools are required
* disengagement of connectors is unlikely under most anticipated spill conditions

Ease of Use

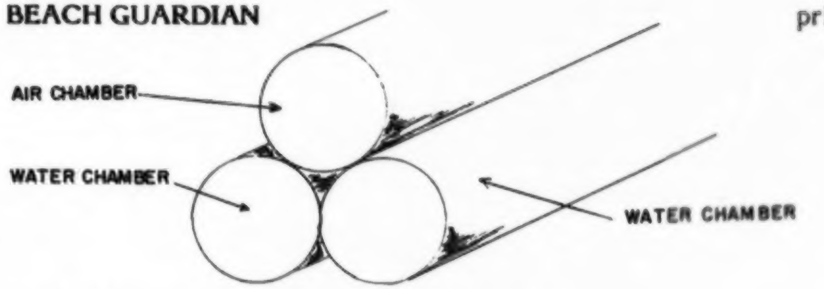
* boom has moderate compactibility for permanent type; floats detach for shipping/storage
* mechanical assistance required for launching and recovery due to boom's weight
* anti-fouling feature reduces maintenance on permanently placed boom
* rounded floats and lack of chain reduce snagging potential; care is suggested during handling because of outrigger-style of flotation
* accessories are available to customize installations
* simplicity of design allows quick cleaning and field repairs if necessary

Design Features

* choice of material and molded flotation suit permanent-type boom
* handholds and anchor points are standard features
* metals used in connectors and fastenings are corrosion-resistant
* straight-forward design excludes ballast, tension members and permanently-affixed floats
* outstanding features include overall durability, system of segmented flotation, and low maintenance requirements

Vikoma International Ltd.
Vikoma House
Chertsey Road
Woking, Surrey GU21 5BP, England
telephone (44)(04862)25911
telex 859277 a/b VIKINT G

BEACH GUARDIAN



price (point of manufacture
$US/m effective 1-1-83)

Type 1	$52
Type 2	$65

PHYSICAL SPECIFICATIONS

Dimensions	Type 1	Type 2
overall height	30 cm	46.5 cm
freeboard/flotation	15 cm	30.5 cm
draught	15 cm	30.5 and 46.0 cm
section length	10 m	10 m
shipping volume	unspecified	

Weight		
per section	unspecified	34 kg
per unit length	unspecified	3.4 kg/m

Fabric (both models) - orange, nylon-reinforced polyurethane

tensile strength	80 kg/cm
tear strength	40 kg
cold crack temperature	-20°C
weight	355 g/m^2

Flotation - air-inflated cylindrical chamber in both models

diameter	15 cm	30.5 cm
buoyancy: weight ratio	unspecified	

Connector - universal, extruded aluminum

Ballast/Lower Tension Member -		
type	wire	chain
size	4 mm	6 mm
breaking strength	1280 kg	1680 kg

Other Data - no anchor points, handholds, vertical stiffeners, connectors, top tension member; double lower water-filled chamber in 46.5 cm model provides ballast and seals boom in intertidal zone against beach; vertical webbing restrainers in ballast compartments

OPERATIONAL DATA

Application

* shoreline work and other more general inshore use
* Type 1 applicable in sea state 0-1; Type 2 applicable in up to sea state 1-2
* consider primarily for stationary containment at or near shoreline for working periods of several days or more; angled deflection of oil in low currents (less than 0.5 knot (0.9 km/h)) should also be possible; Type 1 should be used in calm water only

Oil Containment

* air chamber plus ballasting (low chamber in Type 2) should render booms stable; submerging, planing and skirt deflection should not be problems
* cylindrical buoyancy should allow boom to conform well to waves
* freeboard and draught are adequately sized to prevent splashover and drainage under indicated conditions of use

Strength and Durability

* nylon/urethane fabric resists weathering, puncture, abrasion and tearing
* sealed junctures should not disengage upon repeated contact with shoreline
* lower tension member adds to tensile strength by assuming loading when boom is afloat
* puncture of air chamber (or water chambers of Type 2) could halt application of boom

Connection System

* universal connector slides easily and quickly together
* there is no male/female distinction of section ends; tools are not required
* separate interconnection of tension member is not required
* disengagement of couplers is unlikely under specified conditions of use

Ease of Use

* booms should be highly compactible to minimize transportation and storage needs
* air inflation of buoyancy chamber is required prior to deployment
* smooth sides should allow snag-free launching and retrieval
* concept of dual lower water chambers providing seal at shoreline is unique; this feature should allow more efficient skimming of contained oil nearshore
* choice of material allows ease of cleaning, maintenance and repair
* water-filled lower chambers add considerably to weight so that manoeuvring boom in intertidal zone could require mechanical means

Design Features

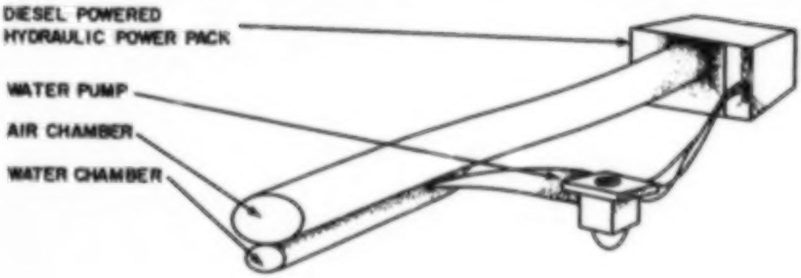
* air chamber results in excellent wave conformance; debris or sharp objects at shoreline could cause puncture although boom is intended for nearshore work
* choice of material is good insofar as wear and abrasion are concerned
* addition of strength member enhances strength qualities and ensures stability in lower currents
* shoreline sealing aspect is unique intended design function of boom
* vertical webbing restricts water movement in ballast chambers of Type 2

COASTAL, SEAPACK & BOOM DECK REEL

(Vikoma International Ltd.)

price (point of manufacture
$US effective 1-1-83)

Coastal Pack $56 000
SeaPack 80 price upon request
Boom Deck Reel $130 000



PHYSICAL SPECIFICATIONS

Dimensions	Coastal	Sea Pack	Boom Deck
overall height	86 cm	118.6 cm	112 cm
freeboard/flotation	43 cm	69 and 7.6 cm*	69 cm
draught/ballast	43 cm	43 cm	43 cm
standard length	250(300) m	450 m	500(600) m
shipping volume (package)	12.1 m^3	34 m^3	23 m^3
		*flotation cuff	
Weight			
boom only (per section)	1020 kg	2255 kg	2200(2700) kg
per unit length	4.1 kg/m	5.0 kg/m	4.4 kg/m
complete package	1690 kg	4535 kg	5500 kg

Fabric - black (all models), neoprene/nylon/neoprene in all models (also consult manufacturer)

tensile strength	52.6 kg/cm	132 kg/cm	unspecified
tear strength	unspecified	unspecified	544 kg
cold crack temperature	-40°C (all models)		
weight	1010 g/m^2	920 g/m^2	1237 g/m^2

Flotation - air-inflated continuous cylindrical chamber in all models

diameter	(see freeboard/flotation)
buoyancy: weight ratio	30:1
other data	all models are continuously inflated by air fan

Ballast - lower tube continuously fed water by propellor; see draught/ballast

Other Data - Boom Deck Reel which replaces Ocean Pack requires power source; Coastal Pack Reel and Sea Pack 80 include power packs; no anchor points, vertical stiffeners, handholds, connectors

OPERATIONAL DATA

Application

- Coastal designed for protected waters; Sea Pack and Boom Deck Reel intended for more exposed conditions including open coastal and offshore situations
- Coastal functions to sea state 2; Sea Pack, Boom Deck Reel to sea state 2-3
- consider for both stationary containment of oil as well as deflecting and containing drifting slicks at Sea; working periods of several days or more should be expected

Oil Containment

- upper and lower chambers render booms highly stable; excellent resistance to submerging, planing and skirt deflection
- flexible, cylindrical air chamber results in excellent wave conformity
- freeboard and draught are adequate to prevent splashover and drainage

Strength and Durability

- fabric resists weathering and abrasion; tearing may occur if sharp objects contacted
- fabric seals are vulcanized; disengagement is unlikely in sea states 0-4
- mechanical components including power unit and ancillary hardware maintain boom in deployed state; their malfunction could halt application of the barrier
- all systems are designed for multiple reuse

Connection System

- all booms are available as continuous lengths without connectors

Ease of Use

- booms are highly compactible; storage on reel or deployment vessel is possible
- deployment is facilitated by smooth sides and lack of tension member
- all models depend upon continuous operation of a water pump, air fan and prime mover which must be thoroughly maintained between deployments to avoid malfunction
- hardware is heavy and requires substantial deck space; training, preplanning deployments are vital to the successful operation of all Vikoma booms

Design Features

- all models have high reserve buoyancy resulting in wave conformity and stability
- SeaPack 80 includes flotation cuff above main air chamber which fills from compressed air cylinders to commence inflation
- power pack includes diesel engine drive, clutch, air fan, and water pump
- portable electric vulcanizer is optional
- power block assembly can be purchased for mechanical recovery of boom
- performance of all systems relies on operation of mechanical components; short-term containment procedures benefit from the quick deployment times the mechanical systems offer but long-term activities could be affected by failure of ancillary units

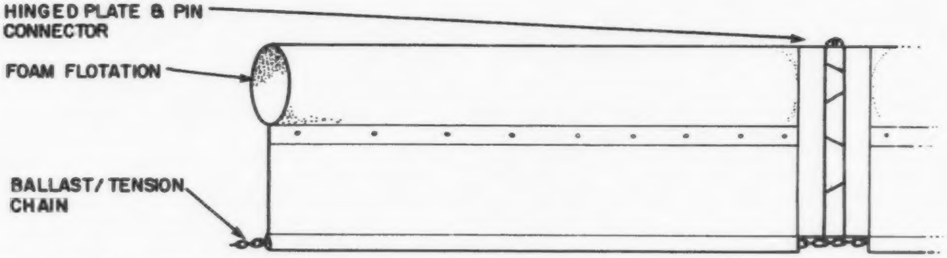
ADDITIONAL INFORMATION

1. Corpuz, P.R. and R.A. Griffiths, Field Tests of Six Offshore Oil Containment Booms, CG-D-78-78, US Coast Guard, Washington, D.C. (November, 1978).

2. A Winter Evaluation of Oil Skimmers and Booms, Environment Canada, Ottawa, Ontario (in preparation).

William Warne Ltd.
India Rubber Mills
Barking, Essex IG11 7LL, England
telephone (44)(01)594-3800
telex 23979

WARNE ANTI-POLLUTION BOOM T8 and T16 price upon request



PHYSICAL SPECIFICATIONS

Dimensions	T8	T16
overall height	66 cm	84 cm
freeboard	15 cm	33 cm
draught	51 cm	51 cm
section length	15.2 m	15.2 m
storage volume	3.5 m^3	3.5 m^3
Weight		
per section	159 kg	227 kg
per unit length	10.4 kg/m	14.9 kg/m
Fabric (both models) -	black, polyurethane-coated nylon	
tensile strength	44.5 kg/cm	
tear strength	30 kg	
cold crack temperature	-30°C	
weight	1200 g/m^2	
Flotation -	(3-m foam cylinders in both models)	
diameter	20 cm	41 cm
buoyancy: weight ratio	2.1:1	6.5:1
Connector -	metal hinge plates joined with pin	

Ballast/Lower Tension Member - 12.7 mm chain weighing 4.3 kg/m with an ultimate tensile strength of 4535 kg in both models

Other Data - no upper tension member, vertical stiffeners; anchor points along ballast chain

OPERATIONAL DATA

Application

* permanent installations or more general long-term use in semi-protected waters
* applicable in up to sea state 1-2
* consider primarily for stationary containment for periods of several days to several months; deflection of oil in low currents (0.5 knot (0.9 km/h) or less) should also be possible

Oil Containment

* cylindrical flotation plus bottom tension chain should render boom stable; very good resistance to submerging, planing and skirt deflection
* segmented, round floats separated by flexible fabric sections should result in good wave conformity
* freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

* heavy fabric resists weathering, punctures, abrasion and tearing
* welded fabric junctures are reinforced below flotation and have low probability of disjuncture
* large chain adds considerably to overall strength qualities by assuming loading
* enclosed foam segments withstand impact from debris

Connection System

* hinged plate and pin interlock easily
* distinction must be made between male and female connecting plates
* durable coupler is suitable for long-term use
* on-land preconnection is required due to type of connector and boom weight
* tension chain requires separate interconnnection

Ease of Use

* booms are not highly compactible (of less concern for a permanent boom)
* high boom weight requires the use of mechanical assistance for handling, deployment and retrieval
* enclosed tension/ballast chain and flotation result in a smooth-sided, snag-free boom
* booms should be easily cleaned, maintained and repaired
* reuse should be possible

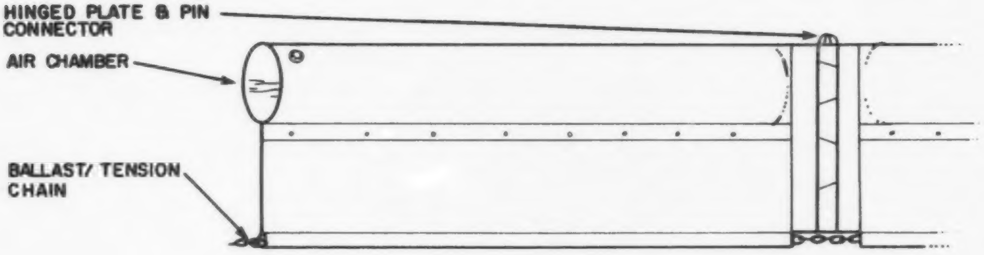
Design Features

* T16 has high reserve buoyancy; T8 is adequate in this respect; wave conformity of foam segments should therefore be good
* boom fabric is excellent choice of material for permanent boom because of durability, anti-wear properties
* overall design suggests potential utilization of boom in emergency situations over long-term or where survivability in occasional higher sea states may be a factor
* reinforced attachment is provided at connectors and along fabric seam below flotation element

WARNE ANTI-POLLUTION BOOM E16, E8 and S

(William Warne Ltd.)

price upon request



PHYSICAL SPECIFICATIONS

Dimensions	E16	E8	S
overall height	84 cm	53 cm	66 cm
freeboard	33 cm	15 cm	15 cm
draught	51 cm	38 cm	51 cm
section length	15.2 m in all models		
storage volume	0.78 m^3	0.50 m^3	0.50 m^3
Weight			
per section	91 kg	68 kg	91 kg
per unit length	6.0 kg/m	4.5 kg/m	6.0 kg/m
Fabric (all models except as noted) -	black, polyurethane-coated nylon		
tensile strength	20.5 kg/cm	20.5 kg/cm	44.5 kg/cm
tear strength	6.8 kg	6.8 kg	30 kg
cold crack temperature	-30°C		
weight	unspecified	unspecified	1200 g/m^2
Flotation (air chamber in all models)			
diameter	33 cm	15 cm	15 cm
buoyancy: weight ratio	17.5:1	5:1	3.8:1
Connector -	metal hinge plates joined with pin		

Ballast/Lower Tension Member - 9.5 mm chain weighing 2.5 kg/m with an ultimate tensile strength of 2267 kg in all models

Other Data - no upper tension member, vertical stiffeners; smaller LF (foam) and LA (air) booms also are listed in sales literature

OPERATIONAL DATA

Application

- * E8 and S: protected waters including harbours; E16: more exposed locations and general nearshore use; S model can be submerged and refloated to allow vessel entry
- * E8 and S applicable in up to sea state 1-2; E16 applicable in up to sea state 2
- * consider primarily for stationary containment of oil for several days to 1-2 weeks; deflection of oil in low currents (0.5 to 1 knot (0.9 to 1.8 km/h) or less) should be possible

Oil Containment

- * cylindrical air chamber plus bottom tension chain renders boom highly stable; excellent resistance to submerging, planing and skirt deflection
- * flotation element flexes to result in excellent wave conformity
- * freeboard and draught are sized adequately to prevent splashover and drainage

Strength and Durability

- * coated fabric resists weathering, puncture, abrasion and tearing
- * welded fabric junctures are reinforced below flotation and have low probability of disjuncture
- * large tension chain adds substantially to overall tensile strength by assuming loading
- * buoyancy could be lost if air chamber is punctured; no indication is given of supplementary means of flotation

Connection System

- * hinged plate and pin interlock easily
- * distinction must be made between male and female connecting plates
- * on-land preconnection is suggested for all booms to ensure alignment of hinges and pins; calm, stationary conditions may permit in-water connections
- * tension chain requires separate interconnection

Ease of Use

- * good compactibility minimizes storage and transportation needs
- * air compressor is required for inflation of buoyancy chamber
- * booms have moderate weight and mechanical assistance may be required for handling depending upon the specific circumstances
- * enclosed tension/ballast chain and smooth sides should preclude snagging during launching and retrieval
- * booms should be easily cleaned, maintained and repaired
- * several reuses should be possible

Design Features

- * S model has very high fabric weight; it can be submerged at terminals to allow entry of vessels and later floated thus serving as a permanent boom where its continuous use is required
- * all booms have high reserve buoyancy particularly E16 Boom; this should result in excellent wave conformity in view of flexibility of air chamber
- * reinforcement is provided at point of attachment of connectors and along fabric seam below air chamber
- * buoyancy chamber deflates when boom is not in use to minimize storage space requirements
- * overall design is simple yet comprehensive; the combination of air chamber and enclosed tension chain is a good concept

ABBREVIATED ENTRIES

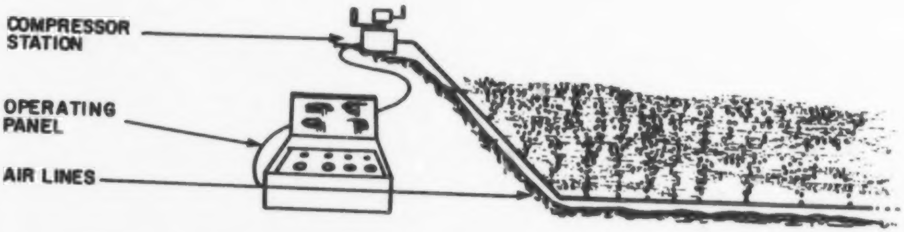
Ajit Sha Inc.
2310 Fainridge Place
Rowland Heights, CA, 91748, USA
telephone (213)965-5213
telex 67-0375 a/b ROHS

- Expandi Boom

Ajit Shah markets Expandi oil boom in the United States. The company also sells other response equipment so that complete hardware packages can be purchased from the firm. See also the Main Entry Expandi Systems AB for detailed information on the boom.

Atlas Copco Canada Inc.
P.O. Box 745
Pointe-Claire, Dorval, Quebec
H9R 4S8, Canada
telephone (514)631-5571
telex 05-821826

- Pneumatic Barrier



Atlas Copco is a world-wide group of companies specializing in air compressors and pneumatic hardware. The firm markets an oil protection bubble barrier designed for use at shore-based terminals where crude oil and other products are loaded and off-loaded. Compressed air is released through a submerged perforated hose so that bubbles rise to the surface creating a surface flow of water which halts the spread of oil. Main components include a compressor station, control panel, evacuation valves and a shielding wall at the shore if insufficient depth occurs to prevent proper functioning of the barrier. The main advantages of the system are the unimpeded access to the terminal gained by vessels and the quick means available to activate the barrier. Disadvantages include the effects of wind, current and excessive water depths.

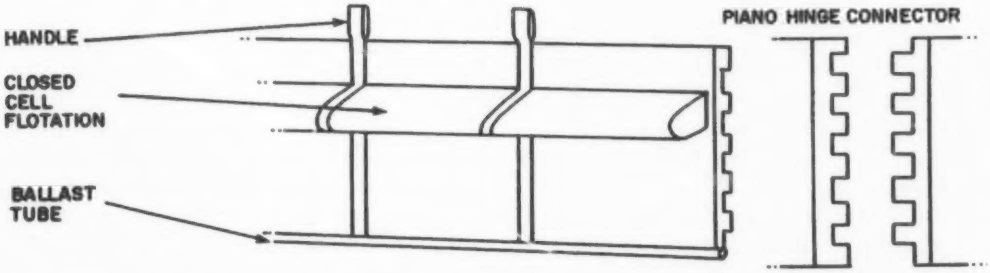
Bennett Environmental Consultants Ltd. - Firefence
209B - 1571 Bellevue Avenue
West Vancouver, B.C.
V7V 1A6, Canada
telephone (604)922-0913
telex 04-352798

Bennett has designed a lightweight boom fabricated from galvanized sheet steel. Known as the Firefence, the 4.5 kg/m boom is produced in 2.7 m sections which incorporate piano hinge flexing panels and join together by thumbsrews. Evaluation of the boom has been undertaken at OHMSETT including an examination of its retention and towing properties.

Bennex A/S Marine Products and Services - Nofi Boom
N. Toolbodkai
P.O. Box 1992
N-5011 Bergen-Nordues, Norway
telephone (47)(05) 21 41 61
telex 42 908 a/b SEA N

Bennex is a marketing company which includes an engineering service core. The firm sells the Nofi oil containment boom system. See Main Entry under Nofi A/S.

B.F. Goodrich Engineered Systems Company - Seaboom
A Division of the B. F. Goodrich Company
430 South Main Street
Cohasset, MA, 02025, USA
telephone (617)383-600



B.F. Goodrich fabricated oil containment barriers designated 18 PFX, 36 PFX, 18 SU and 36 SU. The PF models were designed for permanent installations and long-term immersion. The SU types incorporated ballasting tubes which allowed the boom to be sunk and then raised when needed by means of an air control manifold. All booms were sold under the trade name Seaboom. Submarine Engineering Associates, Inc. marketed the containment systems. Inquiries about the containment booms were not answered.

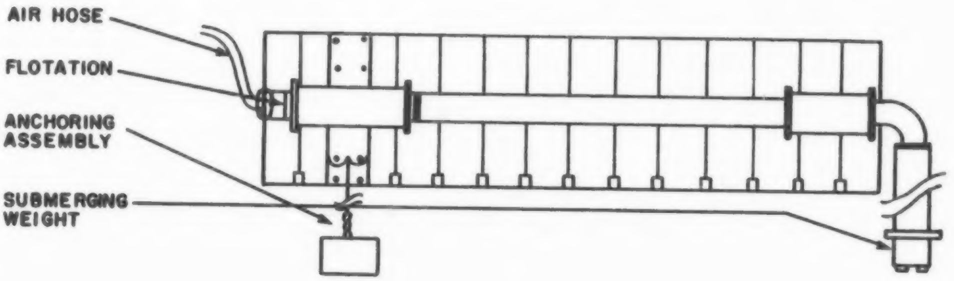
The company has more recently developed an inflatable barrier on behalf of the US Coast Guard. For information on this boom, including performance data, consult: A Winter Evaluation of Oil Skimmers and Booms, Environmental Protection Service, Environment Canada, Ottawa, Ontario (in preparation).

Blue Water Marine Supply, Inc.
P.O. Box 5457 - TR
Houston, Texas 77012, USA
telephone (713)928-5951

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit response.

Bridgestone Tire Co., Ltd.
Industrial Rubber Products Export Section
1,1-chome
Kyobashi, Chuo-Ku
Tokyo, Japan
telephone (81)(3)567 0111
telex J22217

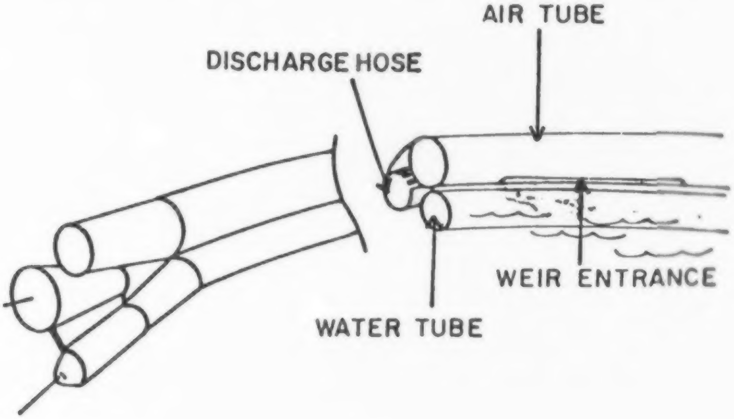
- Floating Submerging Oil Fence



Bridgestone manufactured models 300H and 500H of a floating-submerging barrier designed for permanent installation at ship terminals. The boom featured a unique pleated skirt made of an oil-, fire- and weathering-resistant rubber compound. The boom would be submerged and anchored in place to permit vessel entry. It could then be raised when required by sending air from a shore-based compressor through rubber flotation hoses running the length of the boom and located on either side at its mid-point. Surfacing was achieved at a rate of 30-59 m/min depending on air compressor capacity. Tensile strength of the boom was 5000 kg, reserve buoyancy about 55% and weight 10 kg/m for model 300H and 15 kg/m for model 500H. Marketing in Canada was carried out by Pains-Wessex Canada Ltd.

British Petroleum Company Limited - Weir Boom System
Research Centre
Sunbury-on-Thames
Middlsex, England
TW16 7LN

British Petroleum, with the support of the Norwegian and British governments, has developed a weir boom system. Work has proceeded slowly and deliberately on the project which began August 1977 with a full-scale prototype evaluated in November 1979 at the Ixtoc-1 well blowout in Mexico followed by testing of the skimming component at OHMSETT in October 1981 under a private user's agreement. Sales literature on the system was not received.



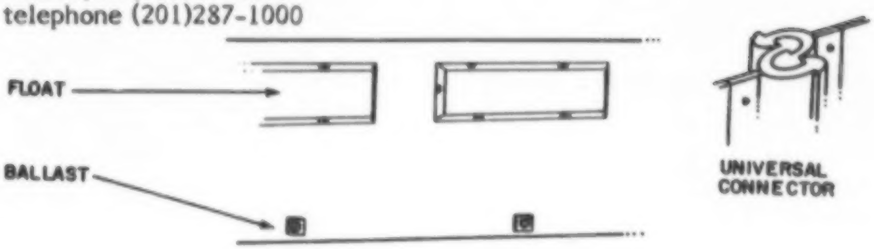
The device is based on Boom Deck Reel (previously known as the Oceanpack) marketed by Vikoma International Limited (see Main Entry). It is a boom fabricated from Butaclor-coated nylon material and is comprised of two main chambers, a 0.68 m air tube and a lower 0.56 m water chamber. In the weir system, a third 0.3 m compartment carries hydraulic lines and provides additional buoyancy for the weir pumps and hydraulics. Ten weir openings each 1.2 m long by 75 mm high are spaced at 6-m intervals in a boom 120 m in total length. A plastic vane pump conveys product from each weir; there are ten pumps in total; the pump has been designed to process debris 15 mm in diameter and is protected by a stainless steel grill which prevents larger items from entering. Each pump assembly weighs 30 kg and is mounted in a protective aluminium casing. Total pumping capacity is rated at 625 m^3/h. Other gear consists of 85-kW diesel power pack, two 15 cm centrifugal pumps for on-deck recovery, deflector booms and couplings, and a hydraulic dump valve to relieve pressure in the discharge tube.

ADDITIONAL INFORMATION

Proceedings of the 1981 Oil Spill Conference, American Petroleum Institute, Atlanta, Georgia, pp. 643-648 (March 2-5, 1981).

Cascade Industries Inc.
Talmadge Road
Edison, NJ, 08817 USA
telephone (201)287-1000

- Permanent Harbor Boom

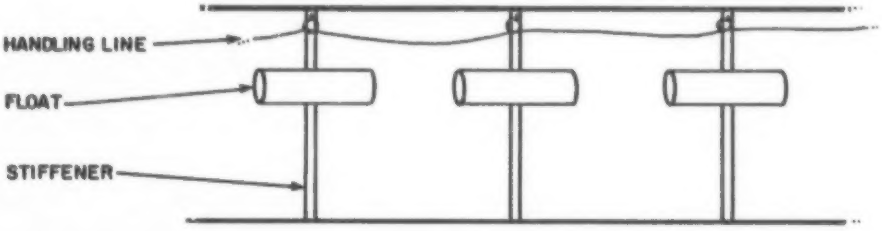


Cascade Industries Inc. has marketed a 61 cm permanent harbour boom made up of a 25.4 cm freeboard and 35.6 cm draught. Each 12.2 m section includes two flotation units on either side of the boom measuring 1.5 m long by 26.7 cm wide. These consist of a polyolefin skin which is UV- and ozone-resistant and is filled with closed-cell urethane foam. The floats are attached by stainless steel nuts and bolts. The boom material is a conveyor belting with a relatively high tensile strength of 236 kg/cm. A heavy duty universal type connector is used fabricated from PVC. Weight of each section is 163 kg including the lead ballast which is also bolted to the boom at regular intervals along its length.

Cascade has also fabricated three inshore booms with flotation diameters of 10.2 cm, 15.2 cm and 20.3 cm manufactured from vinyl-coated nylon. The cylindrical flotation consists of expanded polyethylene foam while the connectors are made of a rigid PVC. The booms were designed for use in rivers, harbours and nearshore areas.

Coastal Services
Executive Offices
22 River Street
Braintree, MA 02184 USA
telephone (617)848-4820

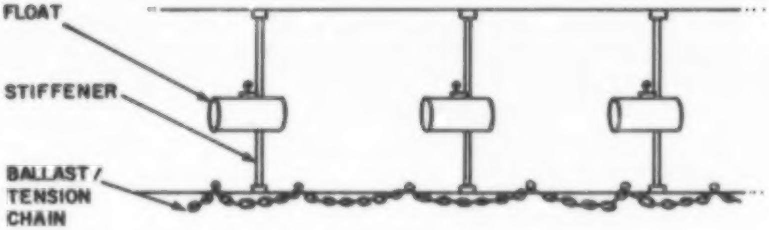
- Coastal Oil Boom



Coastal Oil Boom has been manufactured in three sizes, namely 38 cm, 91 cm and 152 cm. It features detachable, external cylindrical floats, vertical stiffeners and an upper tension member. When the floats are removed, the boom folds compactly for storage. Towing paravanes and magnetic attachements for tanker and dock anchoring have been advertized as available accessories.

Colloid Chemical Company
P.O. Box 861
Brockton, MA, 02403 USA
telephone (617)583-7850

- Spilldam - 360
Oil Containment Boom

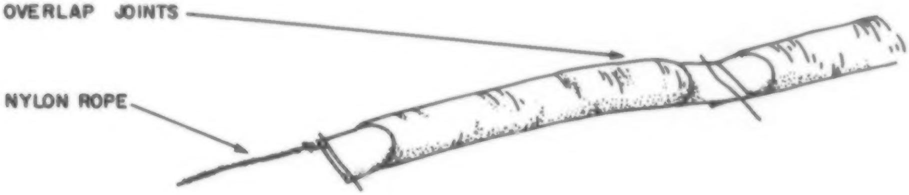


The Spilldam 360 is a 91.5 cm boom comprised of 30.5 cm of freeboard and 61 cm of draught. The fabric is a 746 g/m^2 vinyl-coated nylon material that has a moderately high grab tensile strength of 89.3 kg/cm. The high visibility yellow boom weighs approximately 4.5 kg/m and is fabricated in 30.5 m sections. Its most distinguishing feature is the detachable cylindrical floats which are made of expanded polyethylene. These fasten via bronze chain and toggle connectors adjacent to fibreglass reinforced stiffeners. Ballast consists of hot dip galvanized steel chain hung externally from the skirt's bottom edge. Construction detail includes stitching, rivetting and grommets.

The company has also been known as Brockton Equipment Corporation.

Darcy Products Ltd.
Invicta Works, East Malling
Nr. Maidstone, Kent ME19 6BP, England
telephone (44)(0732)843131
telex 95131

- Drizit



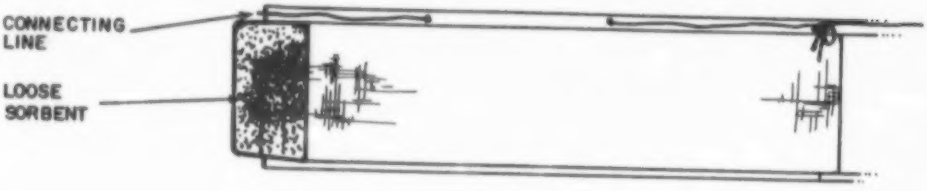
Darcy Products manufactures standard sorbent booms 4 m in length by approximately 18 cm in diameter as well as mini-sorbent booms 1.5 m long by 18 cm in diameter. Sections of boom can be joined together by lines provided; they can be anchored via nylon retaining ropes incorporated in the ends.

Fluid Solids Inc.
P.O. Box 295-T
Saugatuck Station
Westport, Connecticut, USA

A questionnaire sent to Fluid Solids Inc. at the above address was returned unanswered. Fluid Solids Inc. appears as a manufacturer of booms on a list of oil spill equipment suppliers.

Grefco Inc.
Control Products Unit
3450 Wilshire Blvd.
Los Angeles, CA, 90010, USA

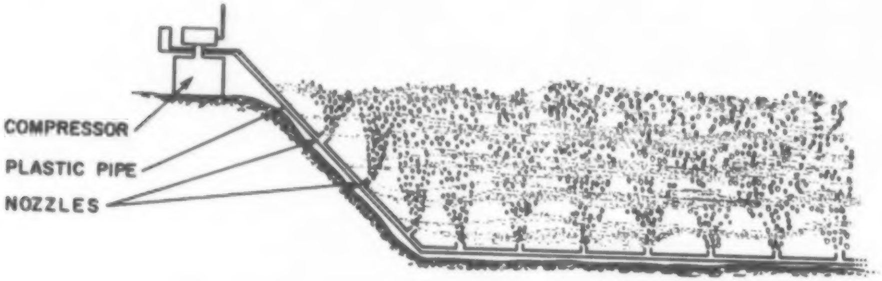
- Grefco Sorbent Boom



Grefco manufactures a wide range of sorbent products utilizing a combination of inert perlite particles and recycled cellulose fibres. The company's Sorbent Booms are available in standard 3 m lengths which have a diameter of 23 cm. Sections join together via a 816 kg test line running through brass grommets along one side of the boom. A male-female connection tied through overlapping grommets at each boom end provides additional strength.

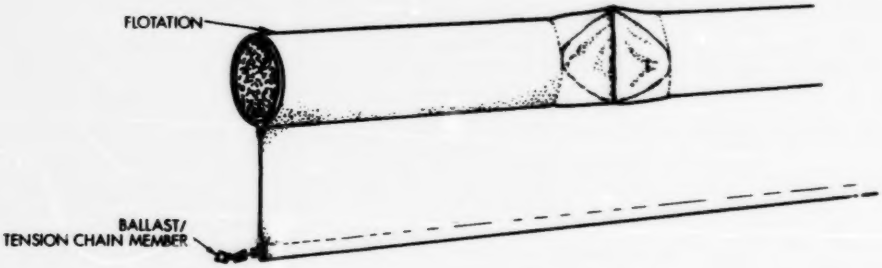
Harmstorf Ltd.
65 Cannon Street
London EC4, England
telephone (44)(01)236 2576

- Pneumatic Oilbarrier



The Harmstorf Pneumatic Oilbarrier is available as a complete package which includes plastic piping with nozzles, compressor, pumps and a control package. As with the Atlas Copco device (see Abbreviated Entry), air is released through the subsurface nozzles to form bubbles. These rise to the water surface creating a barrier which halts the spread of oil slicks. The system is mainly intended for terminals because access by vessels is not impeded even with the hardware in place. Disadvantages can include the effects of excess wind, current and water depth.

Hydrotechnik Lubeck - Floating Booms
D-2400 Lubeck 1
Arnimstrasse 59A, Germany
telephone (49)(0451)65175
telex 26754 a/b HYDRO



Hydrotechnik manufactures and markets Types 600, 900, 1, 2, 3 and 4 Floating Booms. Types 600 and 900 are fabricated from a polyester material coated with PVC. Type 600 includes a 40 cm draught and 20 cm freeboard, weighs 2.2 kg/m, and utilizes a 680 g/m^2 fabric with a tensile strength of 60 kg/cm. Type 900 has a 60 cm draught and 30 cm freeboard, weighs 4.5 kg/m, and its fabric is 1150 g/m^2 weight with a tensile strength of 100 kg/cm. Both booms include a galvanized bottom/tension chain and internal cylindrical foam flotation elements.

Boom Types 1 through 4 incorporate flotation ranging from 12.5 cm up to 28 cm in diameter. Skirts are 10 cm to 33 cm in height. The floats are cylindrical elements fabricated from polyethylene connected together by neoprene panels. These are offset by lead ballasting attached at the skirt hem. Types 1-4 are intended for inshore work while the larger 600 and 900 booms are designed for harbour use and other more exposed conditions.

Industrial Plastics Canada Ltd. - Slickbar Mk 7, 10 and 12
P.O. Box 93
Fort Erie, Ontario L2A 5M6
Canada
telephone (416)871-0412

Industrial Plastics represents Slickbar in Canada and markets the Mk 7, 10 and 12 Booms as well as other oil spill control equipment. See Main Entry under Slickbar, Inc.

Jackson (P.D.) Ltd.
Elms court, Westway
Botley, Oxford OX2 9LP
England
telephone (44)(0865) 250249
telex 83550 a/b JACUK

- Pollution Net

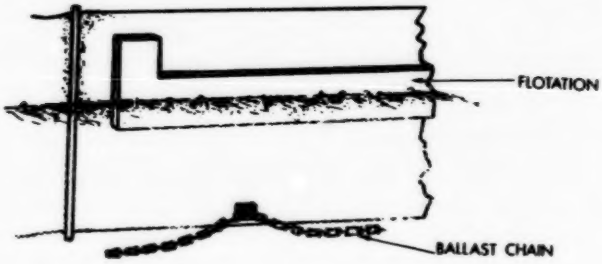
Jackson currently manufactures a unique netting system which is designed to entrap and concentrate slicks in a manner similar to purse seining. Two standard overall heights of 1 m and 2 m are available, with freeboard and draught divided evenly over those heights. The larger offshore unit weighs approximately 11 kg/m while the smaller inshore model weighs 6.5 kg/m. Tension members are located top and bottom and consist of 14 mm polyester rope. The net fabric is Type 66 nylon reinforced with 10.2 cm of polyester braid along the upper and bottom edges. Other features include polystyrene floats and vertical stiffeners comprised of nylon posts located at 1 m intervals.

An advantage of the seining net is its potential ability to contain certain oils without significant losses in various sea states ranging up to 3. Limitations may include its inapplicability to light oils as well as the tendency for heavier distillate fuels to cling to the netting thus rendering their removal difficult if not time-consuming. The technique also requires a batch process approach which could lengthen the cleanup period for a large spill vis-à-vis continuous removal methods.

Jaton Environ. Inc.
704 Court Street
Brooklyn, NY, USA

Jaton is a registered trade name for a fabric utilized in booms. See Main Entry under Acme Products Co.

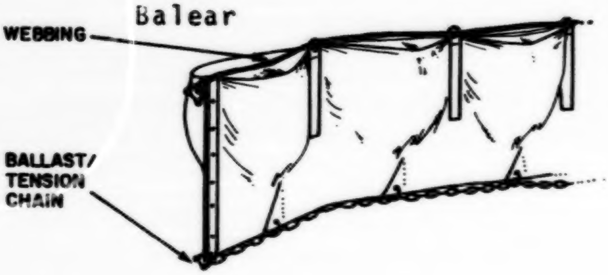
Johns-Manville - Spillguard Boom
22 East 40th Street
New York, NY 10016, USA

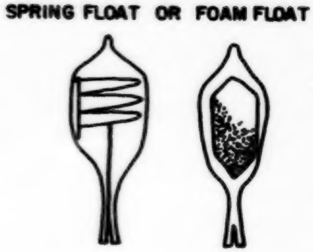


Johns-Manville has actively participated in the development, manufacture and marketing of oil spill containment booms. The company's Spillguard Booms were originally available in sizes of 38 cm and 91 cm fabricated from specially-formulated asbestos rubber sheets and made buoyant by lengths of foam cemented to each side. These "first generation" booms came in section lengths of 30.5 m which were comprised of nine shorter modules joined together by a unique rubber hinge. The company's spill barriers were distributed by Richardson Chemical Cleaning Service Inc. Johns-Manville was also involved in development work on behalf of the US Coast Guard. The booms largely evolved through Offshore Devices, Inc. which has more recently designed and improved upon past spill containment concepts; Offsore has also incorporated a skimming capability within their booms (see Main Entries).

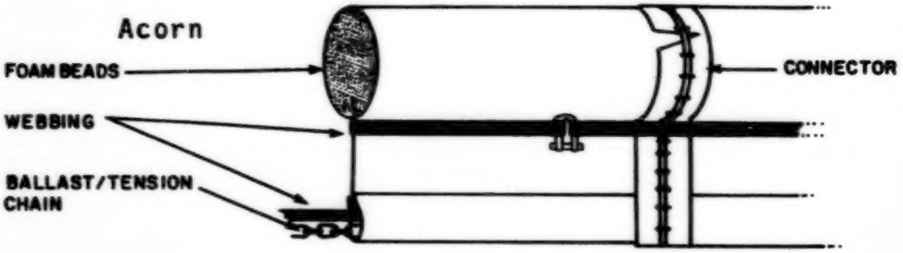
Kleber
6, Avenue Kleber
75784 Paris Cedex 16, France
telephone (33)(1)553-01-00
telex 26-811

- Balear and Acorn Booms





The Balear line of barriers has been manufactured in three models, namely the Balear 1, 2 and 3. Each model in turn has several designations, e.g., BAP 311 and 312, BAP 321 and 322, and BAP 331 and 332. Overall height varies for different models from 80 to 129 cm while weight ranges from 5 to 11.5 kg/m. For each size of boom, two options of flotation type can be specified. These are a spring-loaded, self-inflating air chamber and a permanent-type float composed of styrofoam. A top tension member fabricated of webbing and external bottom tension chain make the boom suitable for use in currents.



The Acorn Boom has an overall height of 80 cm with 30 cm freeboard and 50 cm draught. Weight is 15 kg/m of which 9 kg/m is ballast. The boom's main features are a cylindrical flotation element filled with styrofoam beads, a fully-enclosed bottom tension/ballast chain, and two additional webbing strength members—one immediately above the chain and the other below and adjacent to the flotation. Section lengths of 5 or 10 metres interconnect by means of a unique male-female loop-and-opening arrangement.

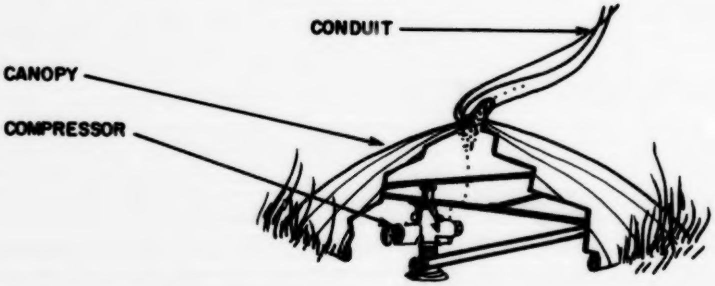
Landrigan Corp.
P.O. Box 294
East Boston, MA, 02128, USA
telephone (617)567-2182

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit a response.

Lans-Marin AB - Sors Screen
P.O. Box 502
183 25 Taby, Sweden
telephone (46)(08)768 06 80

Lans-Marin AB is a firm specializing in oil pollution control. The company markets the Sors Screen Booms manufactured by Sjuntorp AB (see Main Entries).

Logan Engineering & Contracting Co. - Underwater Canopy (Aqua Dome)
5731 St. Augustine Road
Jacksonville, FL 32207, USA
telephone (904)731-0000
telex 56227



Although Logan Engineering appears on lists of manufacturers of spill containment barriers, the firm specializes in the submerged canopy concept as well as engineering operations and services related to marine activities and structures. The company manufacture's a subsurface containment device designed to entrap oil leaking from the sea bottom or other source. Materials of construction depend upon location and vary from plastic-coated fabrics to steel or aluminum. The canopies can also range in size from about 1 metre in diameter to approximately 10 m^2.

Lunastran Inc.
1334-T N 10th Street
San Jose, CA, USA

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit a response.

Mannesmann Italiana SpA - Merkalon, Stainless Steel Booms
Anti-Pollution Department
Via G. D'Annunzio, 2-104
16121 Genova, Italy
telephone (39)(10)581.043
telex 270042 a/b PUDEL GE

In addition to making conventional barriers (see Main Entries), Mannesmann Italiana also manufacture two other special booms. The first is a polyropylene fibre boom that can be used to contain and absorb oil. It features an inner core of filter cloth which retains light-to-medium viscosity oils penetrating an outer layer of filter material. Diameters of the flotation element vary between 18 and 60 cm.

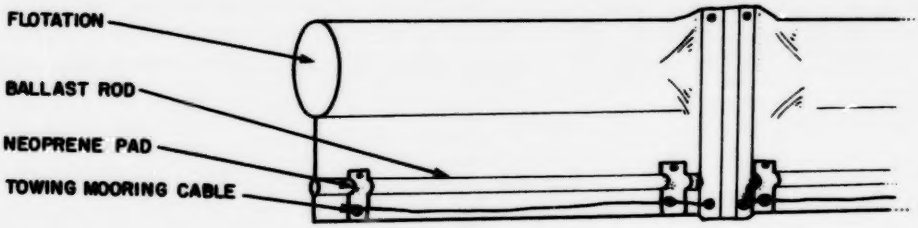
The second spill containment product is a stainless steel, fire-resistant boom. It has an overall height of 70 cm of which 30 cm are freeboard and 40 cm are draught. Section lengths weigh 16 kg and are 1.5 metres in length. These interconnect by sliding performed male and female section ends together. The manufacturer states that the boom is capable fo withstanding 800°C and higher although burning crude oil can attain temperatures of 900°C.

Marsan Corp.
P.O. Box 83
RTI 31W060 W. Bartlett Road
Elgin, IL, 60120, USA

The Marsan Oil Barrier has been manufactured in three different sizes incorporating skirts of 38.1, 61.0, and 91.4 cm. Its material of construction is vinyl-covered nylon with air or styrofoam buoyancy, a stiffened freeboard section above the flotation chamber, and a skirt ballasted at its hem with a chain. Standard section lengths of 15.2 and 30.5 m can be joined by snap connectors and feature a dacron tension line running the full section length immediately below the flotation pocket. In models incorporating an air chamber, self-actuating buoyancy devices are spaced every 61 m along the boom.

Inquiries to the Chicago-based company elicited no response.

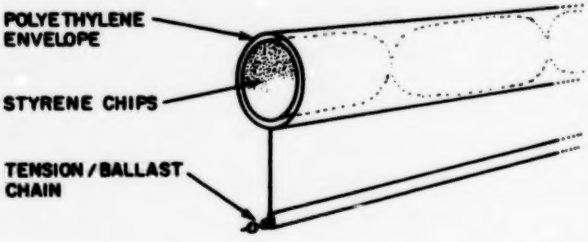
Metropolitan Petroleum Petro Chemicals Co., Inc. - MP Boom
25 Caven Point Road
Jersey City, NJ, 07305, USA
telephone (201)434-4451

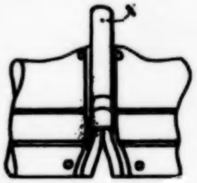


The MP Boom is fabricated in 30.5 m sections from 610 g/m^2 vinyl-coated nylon. A cylindrical flotation element is filled with 6.35 mm diameter polystyrene beads. This is offset by a unique PVC ballast rod inserted into the skirt hem near its bottom edge as well as a 3.2 mm galvanized cable which is located external to the fabric and below the ballast rod. Other features of the boom include the double layer of fabric in the skirt, electronically-welded seams, aluminum connector plates and low-to-medium weight of 3.2 kg/m. No response to inquiries concerning the MP Boom was received; in 1977 the company indicated it had ceased production of its Mash 400 Skimmer.

McDonald R. David (MRD) Inc.
2649 Kilmarnock Cres.
North Vancouver, B.C.
V7J 2Z3 Canada
telephone (604)940-4918
telex 04-352747 a/b EXCELSIOR VCR

- MRD Boom
Semi-Disposable Boom




SLOTTED TUBE CONNECTOR

The MRD Boom has been designed as a use-and-discard oil containment barrier. A prototype tested in August 1982 offshore of Mulgrave, Nova Scotia measured 86 cm in overall height with a 10 cm freeboard and 76 cm draught. Each 15.2 m section weighed 40 kg and occupied 0.6 m^3. A woven polyethylene outer envelope contained polyethylene bags in which polyurethane foam blocks served as flotation. Connectors were slotted ABS tubes with a bottom tension chain.

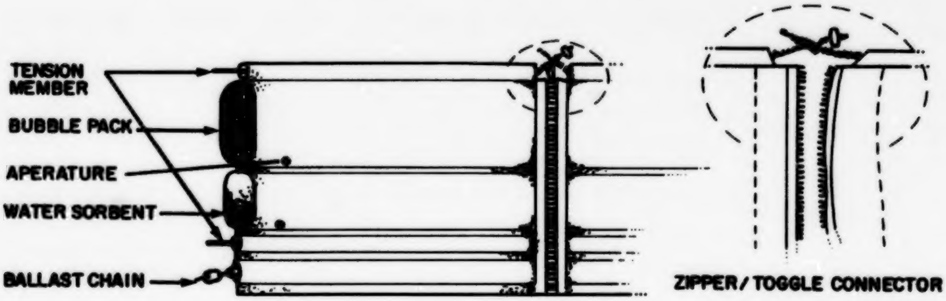
The design of the low-cost MRD Boom is unique but straight-forward; however, testing showed that slight modification to the prototype including improved connector and more stable flotation would substantially improve the boom's performance. Once these changes have been made, an effective product is anticipated with a range of fabrics available.

ADDITIONAL INFORMATION

Solsberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

Morris International Trading Ltd.
1527 Columbia Street
N. Vancouver, B.C. N7J 1A3 Canada
telephone (604)986-2189

- Semi-Disposable Boom
(MI-20B)



The Morris Semi-Disposable Boom has been produced in two overall heights including a 51 cm MI-20B Standard barrier and a 100 cm prototype. Both feature identical construction detail including upper and lower tension members, ballast chain, water ballast compartment and a buoyancy chamber comprised of a plastic bubble pack. A zipper connector is used to join sections which are available in lengths up to 305 m. The boom fabric is nylon strand-reinforced polyethylene material that is double-stitched at its seams.

The smaller 51 cm model has been successfully used in Canada. The 100 cm prototype was examined offshore of Mulgrave, Nova Scotia in August 1982. Its performance was adversely affected by an overballasted condition and the disengagement of the zipper connectors in the regular, short-period wave patterns encountered. Good containment potential of the standard MI-20B Boom more accurately reflects the engineering effort that the company expends in developing a commercial product. The positive features of the containment barrier include its compactability, light weight, simplicity of design and slick containment capability in lower sea state (1), stationary conditions.

ADDITIONAL INFORMATION (100 cm prototype only)

Solsberg, L.B. and R.C. Belore, The Field Evaluation of Five Prototype Lightweight Booms, Canadian Coast Guard, Ottawa, Ontario (September, 1982).

MSE Engineering Systems Ltd. - Intertrade, Megator Booms
265 Canarctic Drive
Downsview, Ontario
M3J 2N7 Canada
telephone (416)661-5646
telex 065-23982

MSE Engineering markets oil spill containment systems manufactured by Intertrade Industries Ltd. and Megator Corporation. Its subsidiary MSE Engineering Systems (Atlantic) Ltd., has offices in St. John's Newfoundland and Dartmouth, Nova Scotia.

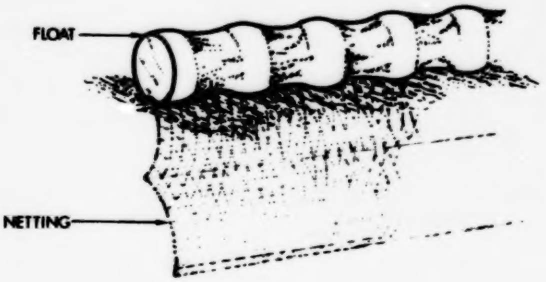
Murphy Pacific Marine Salvage Co.
4300 Eastshore Highway
Emeryville, CA, 94606, USA

Murphy Pacific has been listed as a manufacturer of oil spill booms. No response, however, resulted from a questionnaire sent to the above address.

Nautylatex Canada Ltd. - Balear and Acorn Booms
9000 Boulevard Parent
Trois-Rivières, Quebec
G9A 5L9 Canada
telephone (819)379-0556
telex 05-837129

Nautylatex has represented Kleber in Canada marketing their Balear and Acorn oil spill containment booms. See Abbreviated Entry under Kleber for boom data.

Norske Telektron A/S - Purse Seine Oil Boom
Telektrongarden
Darmmensveien 126
Oslo 2, Norway
telephone (47)(02)55 46 95
telex 16274 a/b TELEK N



The Purse Seine Oil Boom (PSO) is manufactured by Norsk Oljelense A/S and marketed by Norske Telektron A/S. It is fabricated in various heights for use in harbours and offshore. The PSO consists of an upper plastic "canvas" cylinder in which spherical, air-filled floats are spaced at regular intervals. A first section of skirt consists of the plastic fabric and netting. The netting continues below the skirt to a ballast line which incorporates lead weights along its length. The lower component of the boom is designed to contribute to overall stability when the system is towed through the water. Construction of the boom has also been purposely conceived so that no rigid elements are present. This has been done to maximize wave conformance potential as well as to facilitate handling via a ship's winch and boom or capstan. Overall, the concept is an interesting one, with its main strengths lying in what should be good oil containment qualities in higher sea states. This assumes that deployment of the boom is overseen by personnel familiar with offshore marine operations similar to purse seining.

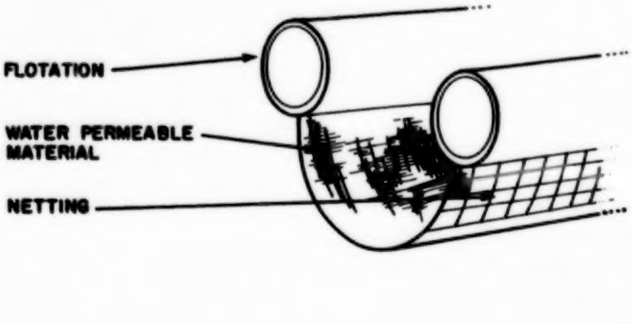
Ocean Systems Inc. - Harbor Oil Containment Barrier
11440 Isaac Newton Industrial Square
North Reston, VA, 22010, USA

Although Ocean System Inc. appears on several lists as a manufacturer of oil spill containment barriers, an inquiry to the company elicited no response at the above address.

Oil Pollution Environmental Control Ltd. - Expandi Boom
1, Nab Lane, Birstall
Batley, West Yorkshire
England
telephone (44)(0924)442701
telex 556463

This firm markets the Expandi line of booms. For more detailed information, see Main Entry Expandi Systems AB.

PACE - PACE Oil Boom
(Petroleum Association for
Conservation of the Canadian Environment)
Suite 1202
275 Slater Street
Ottawa, Ontario
Canada
telephone (613)236-9122

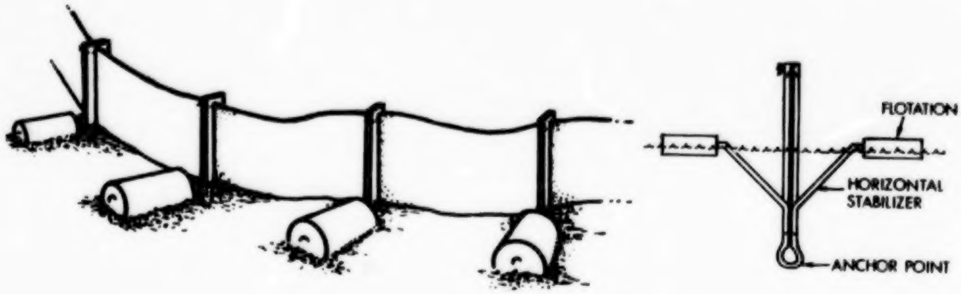


The PACE Oil Boom was developed by Steltner Development & Manufacturing Company Ltd. on behalf of PACE. It was produced in 15-metre sections each consisting of tw cylindrical flotation elements joined by netting and a water-permeable material. The system was designed for placement in a current at an angle so that oil would pass under the upstream float and rise up between the two elements. The oil would then be diverted toward one end for mechanical recovery. A small, portable air compressor was required to inflate the boom.

Manufacturing the boom in quantity did not follow after a series of tests in relatively high currents (1.5 to 2.5 knots (2.8 to 4.6 km/h)) and eventually all rights associated with the boom were turned over to Steltner Development and Manufacturing Company Ltd.

Pacific Pollution Control - Aqua Fence

420 Market Street
San Franscisco, CA, 9411, USA
telephone (415)843-5602



The Aqua Fence boom has been produced in overall heights of 40.6 cm (model 16-C), 61.0 cm (24-C), 91.4 cm (36-C) and 121.9 cm (48-C). It was originally manufactured by Versatech Corporation of Nesconet, Long Island, New York. Boom fabric has a high tensile strength of 286 kg/cm and an adequate tear strength of 54 kg/cm. Standard section lengths vary from 30.5 to 305 m with weight ranging from 6.7 up to 14.9 kg/m depending upon the model. The unique flotation arrangement includes vertical stiffeners, horizontal stabilizers and closed-cell foam floats. The boom includes no tension members. Desirable features include the boom's compactability and its probable potential to follow waves. The currently available Albany International Oil Fence (see Main Entry) incorporates similar design principles.

Inquiries to Pacific Pollution Control were not answered.

Pains-Wessex Canada Ltd.
P.O. Box 2971
Postal Station D
Ottawa, Ontario
K1P 5W9 Canada
telephone (613)828-9738
telex 053-3547

- Floating-Submerging
Oil Fence

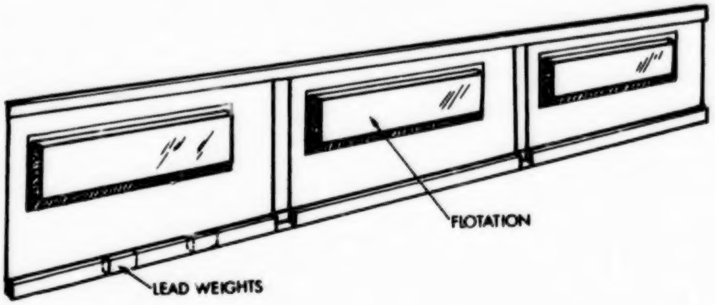
Pains-Wessex represented the Bridgestone Tire Co., Ltd. in Canada and marketed that company's Floating-Submerging Oil Fence. See Abbreviated Entry under Bridgestone Tire Co., Ltd. for information on the boom.

Permalite Europe
18 Ave. Roger Vandendriessche
Boite 9, 1150 Bruxelles
Belgium

Inquiries to Permalite Europe at the indicated address failed to elicit a response. The company appears on a list of manufacturers of oil spill containment barriers.

Pollution Booms Inc.
491 West Main Street
Avon, MA, 02322, USA
telephone (617)588-8800

Oil Slick Barriers



Pollution Booms Inc., a Division of Alfred G. Peterson & Sons, Inc., marketed a 38 cm inshore boom fabricated from PVC. It features 32 mm steel cables top and bottom, closed-cell Ethafoam flotation and lead weights enclosed within the skirt hem which serve as ballast. Standard section length is 15.2 m and standard freeboard and draught are 13 and 25 cm, respectively. Weight of the boom is relatively light at 1.93 kg/m. Inquiries to the company concerning the barrier elicited no response.

Quincy Adams Marine Basin Inc.
47 Palmer Street
Quincy, MA, 02619, USA

Quincy Adams has marketed a unique series of booms comprised of creosote-treated fir timbers which serve as the flotation and a skirt made of 0.32 cm rigid polypropylene. Connectors consist of a neoprene membrane which is brass-riveted to the skirt and to a brass piano hinge which has a removable pin. Lead weights, also riveted to the skirt, serve as ballast. Weight of a 3 m section of boom fabricated with a 5.1 x 10.2 cm flotation timber is 20.4 kg.

Inquiries to the company at the above address produced no response.

Response Systems Inc. - Expandi Boom
820 Ritchie Highway
Severna Park, MA, 21146, USA
telephone (301)647-4424
telex 710 867 5829

Response Systems markets oil spill response hardware and materials including Expandi Boom. See Main Entry Expandi Systems AB for more information.

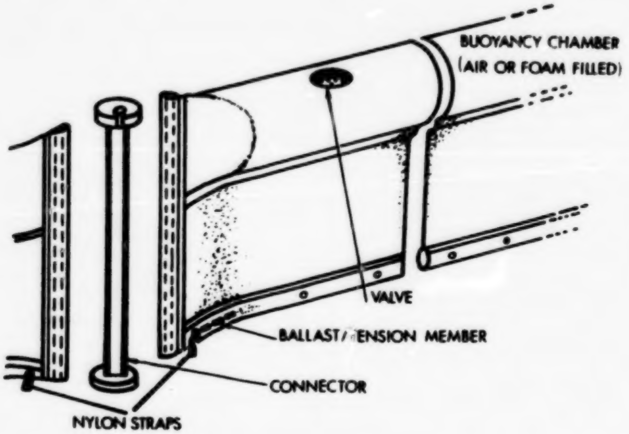
Reynolds Aluminum International Services Inc.
P.O. Box 27002
Richmond, VA, 23261, USA

A subsidiary firm of Reynolds Aluminum known as Reynolds Submarine Service Corp. has manufactured and marketed oil spill containment booms. These were produced in overall heights of 38.1 and 71.1 cm and were fabricated from 3003H14 corrugated aluminum. Flotation was provided by a strip of plastic alloy and offset with galvanically compatible ballast weights, 30.5 m sections could be interconnected using bolts. The flexible booms could be stored on a reel with the smaller model weighing 1.5 kg/m and the larger one weighing 3.9 kg/m.

The company has advised that it no longer manufactures oil spill cleanup equipment.

Skimmex Ltd.
Montagu Mills
32 Bois Moor Road
Chesham, Buckinghamshire HP5 1S4
England
telephone (44)(02405)71144
telex 918986 a/b FISHG

- Oil Retaining Boom
(SK, Zig-Zag and Shoreline Barriers)



Skimmex Ltd. manufactures a wide range of air-inflatable booms that are available in overall heights of 25, 30, 53, 75, 95, and 110 cm. These are designated SK, Zig-Zag and Shoreline Barriers with the majority of the models known as the Skimmex or SK booms. There are 15 varieties of the SK barriers which incorporate air buoyancy chambers or foam flotation and also have optional net (perforated) skirts. All booms include a bottom tension chain of galvanized steel and heat-welded seams which seal the PVC-coated polyester fabric. The foam used in the booms is polyurethane. Connectors are of marine grade aluminum and are designed with three sides any of which accept vertical reinforcing rods enclose at section ends.

The Zig-Zag system is comprised of 450 m of an air-inflatable boom which also includes foam buoyancy. It is stored in a 6 m frame which can also be used for deployment purposes. Other design features of the Zig-Zag include upper tension cables, vertical stiffeners and handles.

The Shoreline Barrier differs from Skimmex's other booms in that the air or foam buoyancy chamber is attached to a lower skirt section incorporating a cylinder on either side which is filled with water to provide draught, ballast, and stability. The boom has an overall height of 53 cm and includes special vent tubes to accommodate the discharge of ballast water.

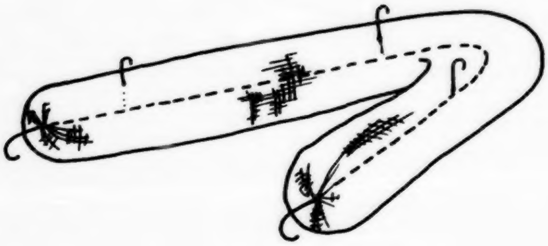
Skuteng A/S - SOOPRES System
P.O. Box 124
Veitvet
Olso 5, Norway
telephone (47)(02)16 08 10
telex 11 784

See also Main Entry under NORGAS AS. Skuteng now is incorporated under the Norgas group of companies. The firm has been involved in the manufacture of Skuteng Booms including a 3 m barrier used in conjunction with an oil collection vessel and known as Unoco's SOOPRES system. The same concept has been used by IHC Holland with their Slicktrail oil recovery ship (a suction hopper dredger). IHC Holland participated in the original development of the SOOPRES equipment.

Smith-Anderson Co. Ltd.
3181 St. James Street, West
Montreal, Quebec H4C 1G7
Canada
telephone (514)933-8472

Smith-Anderson fabricates oil spill booms on behalf of Hurum Engineering Ltd. of Montreal. Information on the Hurum products is listed under that company's name in the Main Entries section.

Sorbent Products Co. Inc. - SPC Sorbent Boom
P.O. Box 174
Maplewood, NJ, 07040 USA
telephone (201)762-4705



SPC oil sorbent booms are available in 3.05 m lengths with overall heights of 20.3 and 12.7 cm. Sections can be linked together by a metal hook and rope loop arrangement. The company also markets sorbent products in other formats but does not fabricate conventional mechanical oil containment barriers.

Spearin, Preston & Burrows Inc. - Harmstorf Pneumatic Oilbarrier
446 West 34th Street
New York, NY, 10001 USA
telephone (212)563-5400

Spearin, Preston & Burrows market the Pneumatic Oilbarrier manufactured by Harmstorf Limited of the United Kingdom. See also Abbreviated Entry under Harmstorf.

Steltner Development & Manufacturing Company Ltd. - PACE Oil Boom
5 Sparkes Street
St. Catherines, Ontario
L2N 4E1 Canada
telephone (416)934-3302
telex 021-5216

See also Abbreviated Entry under PACE

Steltner developed and manufactured the PACE Oil Boom with financial backing from the Petroleum Association for Conservation of the Canadian Environment (PACE). The company owns all rights to patents and manufacturing of the double boom designed for the containment and deflection of oil in currents.

Submarine Engineering Associates Inc. - Sea Boom
430 South Main Street
Cohasset, MA, 02025, USA
telephone (617)383-6000

Submarine Engineering Associates Inc. marketed the B.F. Goodrich SU and PF permanent installation booms (see Abbreviated Entry under B.F. Goodrich Engineered Systems Company). The firm was a technical arm of the parent company which provided assistance on the selection and engineering of Sea Boom containment systems for specific locations.

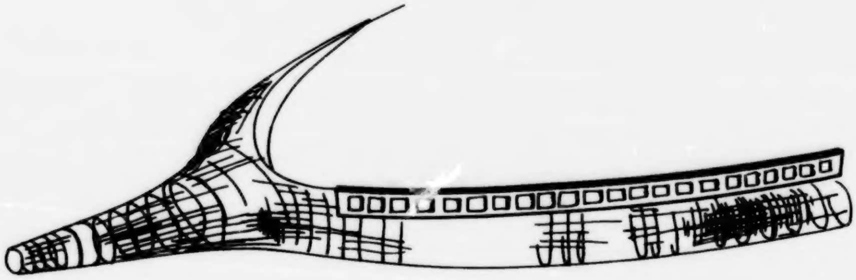
Sunshine Chemical Corp.
P.O. Box 17041
West Hartford, CT,
USA

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit a response.

Surface Separator Systems Inc. - Uniroyal Booms
P.O. Box 5305
Knoxville, TN, 37918 USA
telephone (615)688-8820

Surface Separator Systems Inc. markets booms on behalf of Uniroyal Inc. See Main Entries under Uniroyal.

Svensk Oljetral AB - Swed Trawl
P.O. Box 20
S-430 82 Donso
Sweden
telephone (46)(031)77 05 00
telex 21281 a/b VINGA



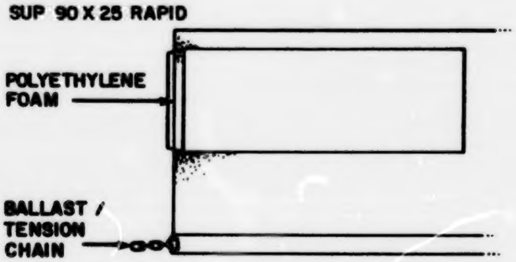
The Swed Trawl oil recovery system consists of oil sorbent pads and a harvesting system. Small polyethylene pads are first broadcast onto a slick in order to initiate the oil recovery process. Deflection arms towed in a U-configuration then direct the oil-laden sorbent back into a funnel-type netting system. This is filled, closed, separated from the trawl and replaced by another fine-mesh net funnel. The oil is separated from the sorbent by a centrifuge.

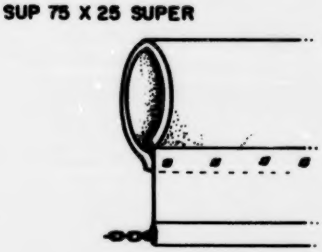
The trawl arms are constructed from nylon/vinyl fabric and have a freeboard of 40 cm. They extend 1.6 m below the surface to form a netted tunnel 4 m in diameter which is ballasted by a chain. A chain also serves as ballast for the fabric section of the arms. The 350 kg trawl system has been conceived to be towed at 2-3 knots so that the saturated sorbent submerges, passes through the tunnels associated with the arms, and finally becomes entrapped in the centrally-located funnel. Success of the device will depend upon the sorbent being efficiently set out in the oil spill on a batch basis, effective oil recovery by the sorbent, deflection of the sorbent into the funnel without significant losses, and quick removal and replacement of the filled funnels. Environmental conditions including wave height, wind velocity and relative current speed will also affect the Swed Trawl's performance.

Swed Sorb International - Swed Trawl
Nygatan 11
681 00 Kristinehamn
Sweden
telephone (46)(0550)836 32
telex 66391 a/b SWSORB S

Sweb Sorb International is the marketing agent for Svensk Oljetral AB's Swed Trawl system (see previous Abbreviated Main Entry under Svensk Oljetral). Swed Sorb also manufactures and sells the Oil Eater Boom -- see Main Entry under Swed Sorb International.

Tampella AB - SUP Booms
Textile Mills
Tampere, Finland





The SUP Booms are manufactured in two standard sizes, namely, a 90 cm boom designated the "Guard Boom SUP 90 x 25 Rapid", which has a total height of 90 cm, and the "Guard Boom SUP 75 x 25 Super" which has a total height of 120 cm. The Super model folds so that the freeboard section becomes a double layer of boom 75 cm in overall height. The Rapid model functions as most conventional barriers and has a single layer freeboard section 25 cm in height.

The SUP Booms are fabricated from a PVC-coated synthetic material which fully encloses rectangular flotation elements composed of a polyethylene foam. A ballast/tension chain is also entirely incorporated in the boom at the skirt hem. The Rapid Boom features vertical stiffeners and is available in 25 m sections each weighing 58 kg. The SUP model is similar in weight at about 60 kg per 25 m section. Both models are smooth-sided, easy to deploy and likely suitable for stationary containment only in sea states of 1-2.

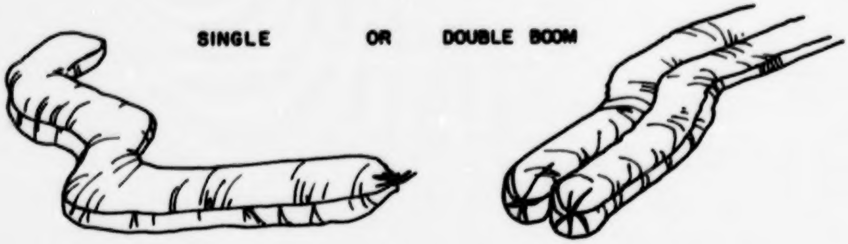
- SUP Booms

The Tarp Shop
(Division of Rent-A-Tarp Ltd.)
1160 Barmac Drive
Weston, Ontario
M9L 1X5 Canada
telephone (416)745-1667
telex 06-965771

The Tarp Shop has marketed Tampella's SUP Booms in Canada but is no longer doing so. For more details on the containment barriers see under Tampella AB, this section.

- Sorbent Boom

3 M
Occupational Health and Safety
Products Division
220-7W 3 M Center
St. Paul, MN, 55144, USA



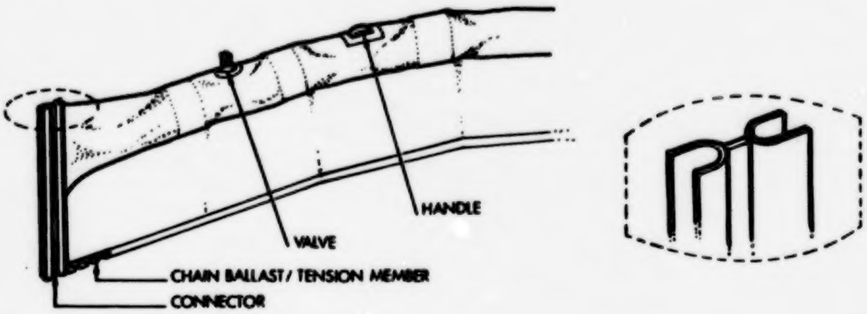
3 M manufacturers a single T-270 sorbent boom and a double-cylinder T-280 oil-sorbing barrier. Sections of both booms can be easily interconnected to form longer lengths as needed. The company also manufactures various other formats of sorbent products. In Canada contact:

3 M Canada Inc.
P.O. Box 5757
Terminal A
London, Ontario
N6A 4T1
telephone (519)451-2500

United McGill Corp.
P.O. Box 820 TR
Columbus, OH, 43216, USA
telephone (614)443-0192

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit a response.

Welsh Oil-Tech Ltd.
13115 NE 124th Street
Kirkland, WA, 98033 USA
telephone (206)827-9616
telex 321182



Welsh Oil-Tech Ltd. has manufactured and marketed a self-inflating boom in overall heights of 30.5, 61.0 and 91.4 cm. The barriers are designed with one-way inflation vents which allow the intake of air. A General Purpose model also includes a series of foam floats while the High Compression Oil Barrier features supplementary foam bulkheads. Both booms are based on a design similar to the Zooom Boom sold by Versatech Products Incorporated (see Main Entry). The standard 15.2 m sections incorporate a ballast/tension chain in the skirt hem and utilize the ASTM (proposed) connectors. Written inquiries to the company elicited no response.

White, H.S. Co. Inc.
78-T Albany Avenue
Freeport, NY, 11520 USA
telephone (516)623-5400

This company was listed in the 1982 Thomas Register as a manufacturer of oil slick containment booms. Written inquiries failed to elicit a response.

Whittaker Corp. - Expandi Boom
5159 Baltimore Drive
La Mesa, CA, 92041 USA

The company has manufactured the Expandi Boom in the United States. An inquiry to the company resulted in a response from Ajit Shah, Inc. also of California. See also Main Entry Expandi Systems AB.